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FOURTEENTH CENSUS OF THE UNITED STATES  
MANUFACTURES: 1919

FLOUR-MILL AND GRISTMILL  
PRODUCTS

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## EXPLANATION OF TERMS.

**Scope of census.**—Census statistics of manufactures are compiled primarily for the purpose of showing the absolute and relative magnitude of the different branches of industry covered and their growth or decline. Incidentally, the effort is made to present data throwing light upon character of ownership, size of establishments, and similar subjects. When use is made of the statistics for these purposes it is imperative that due attention be given to their limitations, particularly in connection with any attempt to derive from them figures purporting to show average wages, cost of production, or profits.

The census did not cover establishments which were idle during the entire year or for which products were valued at less than \$500, or the manufacturing done in educational, eleemosynary, and penal institutions.

**Period covered.**—The returns relate to the calendar year 1919, or the business year which corresponded most nearly to that calendar year, and cover a year's operations, except for establishments which began or discontinued business during the year.

**The establishment.**—As a rule, the term "establishment" represents a single plant or factory, but in some cases it represents two or more plants which were operated under a common ownership or for which one set of books of account was kept. If, however, the plants constituting an establishment as thus defined were not all located within the same city, county, or state, separate reports were secured in order that the figures for each plant might be included in the statistics for the city, county, or state in which it was located. In some instances separate reports were secured for different industries carried on in the same establishment.

**Classification by industries.**—The establishments were assigned to the several classes of industries according to their products of chief value. The products reported for a given industry may thus, on the one hand, include minor products different from those covered by the class designation, and, on the other hand, may not represent the total product covered by this designation, because some products of this class may be made in establishments in which it is not the product of chief value.

**Influence of increased prices.**—In comparing figures for cost of materials, value of products, and value added by manufacture in 1919 with the corresponding figures for earlier censuses, account should be taken of the general increase in the prices of commodities during recent years. To the extent to which this factor has been influential the figures fail to afford an exact measure of the increase in the volume of business.

**Persons engaged in the industry.**—The following general classes of persons engaged in the manufacturing industries were distinguished: (1) Proprietors and firm members, (2) salaried officers of corporations, (3) superintendents and managers, (4) clerks (including other subordinate salaried employees), and (5) wage earners.

The number of persons engaged in each industry, segregated by sex, and, in the case of wage earners, also by age (whether under 16 or 16 and over), was reported for a single representative day. The 15th of December was selected as representing for most industries normal conditions of employment, but where this date did not portray such conditions, an earlier date was requested.

In the case of employees other than wage earners the number thus reported for the representative date has been treated as equivalent to the average for the year, since the number of employees of this class does not ordinarily vary much from month to month. In the case of wage earners the average has been obtained in the manner explained in the next paragraph.

In addition to the more detailed report by sex and age of the number of wage earners on the representative date, a report was obtained of the number employed on the 15th of each month, by sex, without distinction of age. From these figures the average number of wage earners for the year has been calculated by dividing the sum of the numbers reported for the several months by 12. The importance of the industry as an employer of labor is believed to be more accurately measured by this average than by the number employed at any one time or on a given day.

The number of wage earners reported for the representative day, though given in certain tables for each separate industry, is not totaled for all industries combined, because, in view of the variations of date, such a total is not believed to be significant. It would involve more or less duplication of persons working in different industries at different times, would not represent the total number employed in all industries at any one time, and would give an undue weight to seasonal industries as compared with industries in continual operation.

In order to determine as nearly as possible the age distribution of the average number of wage earners for an industry, the per cent distribution by age of the wage earners for December 15, or the nearest representative day, has been calculated from the actual numbers reported for that date. The percentages thus obtained have been applied to the average number of wage earners for the year to determine the average numbers 16 years and over, and under 16, employed.

**Salaries and wages.**—Under these heads are given the total payments during the year for salaries and wages, respectively. The Census Bureau has not undertaken to calculate the average annual earnings of either salaried employees or wage earners. Such averages would possess little real value, because they would be based on the earnings of employees of both sexes, of all ages, and of widely varying degrees of skill. Furthermore, so far as wage earners are concerned, it would be impossible to calculate

late accurately even so simple an average as this, since the number of wage earners fluctuates from month to month in every industry, and in some cases to a very great extent. The Census Bureau's figures for wage earners, as already explained, are averages based on the number employed on the 15th of each month, and while representing the number according to the pay rolls to whom wages were paid on that date, no doubt represent a larger number than would be required to perform the work in any industry if all were continuously employed during the year.

**Prevailing hours of labor.**—No attempt was made to ascertain the number of wage earners working a given number of hours per week. The inquiry called merely for the prevailing practice followed in each establishment. Occasional variations in hours in an establishment from one part of the year to another were disregarded, and no attention was paid to the fact that a few wage earners might have hours differing from those of the majority. All the wage earners of each establishment are therefore counted in the class within which the establishment itself falls. In most establishments, however, practically all the wage earners work the same number of hours, so that the figures give a substantially correct representation of the hours of labor.

**Capital (amount actually invested).**—The instructions on the schedule for securing data relating to capital were as follows:

"The answer should show the total amount of capital, both owned and borrowed, on the last day of the business year reported. All the items of fixed and live capital may be taken at the amounts carried on the books. If land or buildings are rented, that fact should be stated and no value given. If a part of the land or buildings is owned, the remainder being rented, that fact should be so stated and only the value of the owned property given. Do not include securities and loans representing investments in other enterprises."

These instructions were identical with those employed at the censuses of 1914 and 1909. The data compiled in respect to capital, however, at both censuses, as well as at all preceding censuses of manufactures, have been so defective as to be of little value except as indicating general conditions. In fact, it has been repeatedly recommended by the census authorities that this inquiry be omitted from the schedule. While there are some establishments whose accounting systems are such that an accurate return for capital could be made, this is not true of the great majority, and the figures therefore do not show the actual amount of capital invested.

**Materials.**—The statistics as to cost of materials relate to the materials used during the year, which may be more or less than the materials purchased during the year. The term "materials" covers fuel, rent of power and heat, mill supplies, and containers, as well as materials which form a constituent part of the product.

**Rent and taxes.**—The taxes include certain Federal taxes and state, county, and local taxes. Under "Federal taxes" there are included the internal revenue tax on manufactures (tobacco, beverages, etc.), excise taxes when included in values reported for products, corporation capital stock tax, and corporation income tax, but not the income tax for individuals and partners.

**Value of products.**—The amounts given under this heading represent the selling value or price at the factory of all products manufactured during the year, which may differ from the value of the products sold.

**Value added by manufacture.**—The value of products is not always a satisfactory measure of either the absolute or the relative importance of a given industry, because only a part of this value is actually created by the manufacturing processes carried on in the industry itself. Another part, and often by far the larger one, represents the value of the materials used. For many purposes, therefore, the best measure of the importance of an industry, from a manufacturing standpoint, is the value created by the manufacturing operations carried on within the industry. This value is calculated by deducting the cost of the materials used from the value of the products. The figure thus obtained is termed in the census reports "value added by manufacture."

**Cost of manufacture and profits.**—The census data do not show the entire cost of manufacture, and consequently can not be used for the calculation of profits. No account has been taken of depreciation or interest, rent of offices and buildings other than factory or works, insurance, ordinary repairs, advertising, and other sundry expenses.

**Primary horsepower.**—This item represents the total primary power equipment of the manufacturing establishments plus the amount of power, principally electric, rented from other concerns. It does not cover the power of electric motors taking their current from dynamos driven by primary power machines operated by the same establishment, because the inclusion of such power would obviously result in duplication. The figures for primary horsepower represent the rated capacity of the engines, motors, etc., and not the amount of power in actual daily use.

**Fuel.**—Statistics of the quantity of fuel used are shown only for anthracite and bituminous coal, coke, fuel oils, gasoline and other volatile oils, and gas, and represent the quantity used during the year. As only the principal kinds of fuel are shown, comparison as to the total cost of all fuel is impracticable.

# FLOUR-MILL AND GRISTMILL PRODUCTS.

## GENERAL STATISTICS.

**General character of the industry.**—At the censuses of 1904 and 1914 the canvass of the flour-mill and gristmill industry was confined to merchant mills. At all other censuses statistics were also collected for custom mills engaged exclusively in grinding for local consumption. Mills purchasing part of the grain ground have been classified as merchant mills, even though a large part of their business may have consisted of custom grinding.

Because of the omission of custom mills at the censuses of 1904 and 1914, it seems desirable, in presenting the general statistics of manufactures included in other bulletins and reports, to confine the statistics for the industry for 1919 to merchant mills, showing the statistics for custom mills separately, and excluding them in the grand total for all industries. In most of the tables of this special report only merchant mills are represented, Tables 1, 12, and 21 being the only tables which contain statistics for the custom mills.

**Importance and growth of the industry.**—Table 1 presents a summary of the statistics of the industry as a whole, and for merchant and custom mills separately, for 1919 and 1909, with percentages of increase for the ten-year period, while Table 2 summarizes the statistics of the merchant mills for each census since 1899, with the percentage of increase for each census period.

For both merchant and custom mills the value of products includes the estimated value of the flour and other products obtained from grain ground on a custom basis, and likewise the figures for cost of grain include the estimated cost of such grain.

With few exceptions increases are noticeable at each succeeding census. The large increases for the merchant mills, however, from 1914 to 1919, in salaries and wages, cost of materials, and value of products are due largely to the general rise of prices following the World War, and do not, therefore, fairly measure the growth of the industry for that period. The addition of the Federal income tax since 1914 accounts for the large increase in "Rent and taxes."

**States, ranked by value of products.**—Table 3 summarizes the more important statistics of the industry, by states, the states being arranged according to the value of products reported for 1919.

Minnesota continues to be the leading state in the industry; in 1919 the mills of the state gave employment to 13.3 per cent of the total number of wage earners engaged in the industry and reported 18.6 per cent of the total value of products. Kansas ranked second and New York third in value of products and

value added by manufacture. Although not shown in the table, there were a number of changes in the relative rank of the states from 1914 to 1919 as measured by value of products. Thus, Kansas, which ranked third in 1914, advanced to second place in 1919, displacing New York; and Pennsylvania, which ranked sixth in 1914, dropped to tenth place in 1919, being displaced by Missouri, Washington, Indiana, and Texas in the order named.

**Persons engaged in the industry.**—The classification by age of the average number of wage earners in Table 4 is an estimate obtained by the method described in the "Explanation of terms." The classification by sex for 1919 was reported separately, but for 1914 and 1909 was obtained in the same manner as the classification by age. Figures for individual states will be found in Table 20.

**Wage earners, by months.**—As shown by Table 5, the number of wage earners employed in the industry ranged from a maximum of 49,393 in December to a minimum of 42,179 in March, the minimum number being equivalent to 85.4 per cent of the maximum. Figures are given for the states separately, while for the United States for 1919 the number of males and females is also shown.

**Prevailing hours of labor.**—Table 6 shows a marked shortening of the working day for the industry since 1914. In that year only 9.5 per cent of the wage earners were reported as employed fewer than 54 hours per week, as against 40.1 per cent in 1919. In 1914 the "60" and "Over 60" groups constituted 79.7 per cent of the total number of wage earners, as compared with 47 per cent in 1919.

**Size of establishments, by average number of wage earners.**—As shown by Table 7, there were 3,181 establishments in 1919, or 29.7 per cent of the total number for the industry, which employed no wage earners. These were comparatively small establishments in which the work was done by the proprietors and firm members. Of the total number of mills, 58.1 per cent employed 1 to 5 wage earners, and 8.6 per cent from 6 to 20. There were only 134 establishments that employed an average of more than 50 employees, and of these only 52 employed over 100.

**Size of establishments, by value of products.**—At the censuses of 1909 and 1914 establishments with products valued at "\$100,000 to \$1,000,000" constituted one group, but at the census of 1919 this group was subdivided into "\$100,000 to \$500,000" and "\$500,000 to \$1,000,000." Separate figures for the number of establishments and value of products have

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been compiled, however, from the returns for 1914. Table 8, therefore, gives combined figures for these two groups in the case of all items for 1909, and in the case of average number of wage earners and value added by manufacture for 1914. The statistics in this table show the degree of concentration of production in large establishments. In 1919 the three groups having products of \$100,000 and over included 1,978 establishments, or 18.5 per cent of the total number for the industry; but employed 36,256 wage earners, or 79.7 per cent of the total average number; and reported products to the value of \$1,822,762,172, or 88.8 per cent of the total value of products.

**Character of ownership.**—Table 9 shows that in 1919, of the total number of establishments reported for the industry, 24.9 per cent were under corporate ownership. While corporations thus controlled only about one-fourth of the total number of establish-

ments, they employed 76.6 per cent of the total average number of wage earners and reported 83.5 per cent of the total value of products.

**Number and horsepower of types of prime movers.**—From 1914 to 1919, as shown by Table 10, there was an increase in the total horsepower for the industry of 54,021 horsepower, or 6.6 per cent. This increase, however, is wholly due to the gain of 151,019 horsepower, or 133.2 per cent, in rented power, there having been a decrease of 96,998 horsepower, or 13.7 per cent, in power owned.

**Fuel consumed.**—Table 11 shows, by states, the principal kinds of fuel used in the industry in 1919 and 1914. Of the total quantity of bituminous coal used in the industry in 1919, Minnesota and Missouri together reported 27.3 per cent, while Kansas reported 45.5 per cent of the fuel oils consumed, and Ohio and Oklahoma together, 40.8 per cent of the gas.

TABLE 1.—MERCHANT AND CUSTOM MILLS—COMPARATIVE SUMMARY: 1919 AND 1909.

	TOTAL.			MERCHANT MILLS.			CUSTOM MILLS.		
	1919	1909	Per cent of increase. <sup>1</sup>	1919	1909	Per cent of increase. <sup>1</sup>	1919	1909	Per cent of increase. <sup>1</sup>
				1919	1909	Per cent of increase. <sup>1</sup>	1919	1909	Per cent of increase. <sup>1</sup>
Number of establishments.....	21,135	23,652	-10.6	10,708	11,691	-8.4	10,427	11,961	-12.8
Persons engaged.....	90,597	88,849	2.0	75,769	66,054	14.7	14,828	22,795	-35.0
Proprietors and firm members.....	24,386	30,204	-19.3	11,937	14,570	-18.1	12,449	15,634	-20.4
Salaried employees.....	18,596	12,178	52.7	18,351	12,031	52.5	245	147	66.7
Wage earners (average number).....	47,615	46,467	2.5	45,481	39,453	15.3	2,134	7,014	-69.6
Primary horsepower.....	1,095,299	1,126,347	-2.8	876,405	853,584	2.7	218,894	272,763	-19.7
Capital.....	\$830,495,722	\$370,410,280	124.2	\$801,024,507	\$349,151,779	129.6	\$28,871,215	\$21,258,510	35.8
Salaries and wages.....	\$84,856,230	\$35,167,693	141.3	\$82,901,413	\$33,981,153	144.0	\$1,954,817	\$1,186,540	64.7
Salaries.....	\$32,187,911	\$12,564,595	156.2	\$32,013,030	\$12,516,767	155.8	\$174,881	\$47,828	265.6
Wages.....	\$52,668,319	\$22,603,098	133.0	\$50,888,383	\$21,464,386	137.1	\$1,779,936	\$1,138,712	56.3
Paid for contract work.....	\$960,799	(2)	-----	\$942,256	\$869,271	40.8	\$18,543	(2)	-----
Rent and taxes.....	\$19,673,005	(2)	-----	\$19,268,367	\$2,754,128	599.4	\$409,688	(2)	-----
Cost of materials.....	\$1,878,138,382	\$813,891,347	130.8	\$1,799,180,987	\$707,576,479	134.4	\$78,957,395	\$46,314,868	70.5
Value of products.....	\$2,147,218,913	\$938,699,958	128.7	\$2,052,434,385	\$853,584,405	132.3	\$94,784,528	\$55,115,553	72.0
Value added by manufacture <sup>2</sup> .....	\$269,080,531	\$124,808,011	115.6	\$253,253,398	\$116,007,926	118.3	\$15,827,133	\$8,800,685	79.8
Grain ground, bushels.....	888,305,973	872,950,743	1.8	830,028,293	808,247,961	2.9	58,279,680	68,702,782	-12.6

<sup>1</sup> A minus sign (—) denotes decrease.<sup>2</sup> Figures not available.<sup>3</sup> Value of products less cost of materials.

TABLE 2.—MERCHANT MILLS—COMPARATIVE SUMMARY: 1919, 1914, 1909, 1904, AND 1899.

	1919	1914	1909	1904	1899	PER CENT OF INCREASE. <sup>1</sup>			
						1914-1919	1909-1914	1904-1909	1899-1904
Number of establishments.....	10,708	10,788	11,691	10,051	9,476	-0.7	-7.7	16.3	6.1
Persons engaged.....	75,769	65,635	66,054	59,623	(2)	15.4	-0.6	10.8	-----
Proprietors and firm members.....	11,937	12,689	14,570	13,088	(2)	-5.8	-13.0	11.2	-----
Salaried employees.....	18,351	13,248	12,031	7,415	5,522	38.5	10.1	62.3	34.3
Wage earners (average number).....	45,481	39,718	39,453	39,110	32,226	14.5	0.7	(2)	(2)
Primary horsepower.....	876,405	822,384	853,584	775,318	670,719	6.6	-3.7	10.1	15.6
Capital.....	\$801,024,507	\$380,257,420	\$349,151,779	\$265,117,434	\$189,281,330	110.8	8.9	31.7	40.1
Salaries and wages.....	\$82,901,413	\$40,963,303	38,981,153	27,174,558	21,543,154	102.4	20.5	25.0	26.1
Salaries.....	\$32,013,030	\$16,370,141	\$12,516,767	\$7,352,357	5,257,991	95.6	30.8	70.2	39.9
Wages.....	\$50,888,383	\$24,563,162	\$21,464,386	\$19,822,196	\$16,285,163	106.9	14.6	8.3	21.7
Paid for contract work.....	942,256	115,447	669,271	95,218	(2)	716.2	-82.8	602.9	-----
Rent and taxes.....	\$10,263,367	3,795,482	2,754,128	1,219,645	(2)	407.1	37.9	25.4	-----
Cost of materials.....	1,799,180,987	752,270,021	767,576,479	619,971,161	428,116,757	189.2	-2.0	23.8	44.8
Value of products.....	2,052,434,385	877,679,700	883,584,405	713,033,395	501,396,304	133.8	-0.7	23.9	42.2
Value added by manufacture <sup>2</sup> .....	253,253,398	125,409,688	116,007,926	93,062,234	73,279,547	101.9	8.1	24.7	27.0

<sup>1</sup> A minus sign (—) denotes decrease.<sup>2</sup> Exclusive of internal revenue.<sup>2</sup> Figures not available.<sup>3</sup> Figures not strictly comparable.

# FLOUR-MILL AND GRISTMILL PRODUCTS.

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TABLE 3.—MERCHANT MILLS—STATES, RANKED BY VALUE OF PRODUCTS: 1919.

STATE.	Number of establishments.	WAGE EARNERS.			VALUE OF PRODUCTS.			VALUE ADDED BY MANUFACTURE.			STATE.	Number of establishments.	WAGE EARNERS.			VALUE OF PRODUCTS.			VALUE ADDED BY MANUFACTURE.		
		Average number.	Per cent distribution.	Rank.	Amount (expressed in thousands).	Per cent distribution.	Rank.	Amount (expressed in thousands).	Per cent distribution.	Rank.			Average number.	Per cent distribution.	Rank.	Amount (expressed in thousands).	Per cent distribution.	Rank.	Amount (expressed in thousands).	Per cent distribution.	Rank.
United States	10,708	45,481	100.0	...	\$2,052,434	100.0	...	\$253,233	100.0	...	Idaho	78	304	0.7	27	13,501	0.7	26	1,673	0.7	27
Minnesota	248	6,049	13.3	1	381,249	18.6	1	43,376	17.1	1	West Virginia	203	371	0.8	25	13,077	0.6	27	2,546	1.0	24
Kansas	385	3,493	7.7	2	206,881	10.1	2	24,548	9.7	2	Georgia	161	371	0.8	25	11,991	0.6	28	1,443	0.6	29
New York	716	3,012	6.6	4	155,272	7.6	3	19,638	7.8	3	South Dakota	80	221	0.5	31	8,873	0.4	29	982	0.4	32
Illinois	322	2,740	6.0	5	116,563	5.7	4	13,397	5.3	5	Arkansas	166	267	0.6	28	8,646	0.4	30	1,573	0.6	28
Missouri	690	3,015	6.6	3	113,297	5.5	5	15,113	6.0	4	Utah	77	240	0.5	29	7,569	0.4	31	1,017	0.4	30
Ohio	577	2,122	4.7	8	89,397	4.4	6	12,294	4.8	6	Vermont	108	169	0.4	32	6,144	0.3	32	812	0.3	33
Washington	119	1,536	3.4	12	81,141	3.9	7	7,986	3.2	11	New Jersey	150	232	0.5	30	6,040	0.3	33	1,004	0.4	31
Indiana	450	2,283	5.0	6	76,112	3.7	8	9,371	3.7	9	Maine	118	144	0.3	34	5,443	0.3	34	734	0.3	34
Texas	222	1,567	3.4	11	78,064	3.6	9	9,665	3.8	7	Massachusetts	75	123	0.3	35	4,878	0.2	35	629	0.2	36
Pennsylvania	1,138	2,198	4.8	7	69,447	3.4	10	9,462	3.7	8	Alabama	143	152	0.3	33	4,565	0.2	36	717	0.3	35
California	134	1,779	3.9	9	65,448	3.2	11	8,566	3.4	10	New Hampshire	48	83	0.2	37	3,391	0.2	37	405	0.2	37
Wisconsin	221	1,348	3.0	14	58,304	2.8	12	6,567	2.6	13	Connecticut	64	80	0.2	37	2,507	0.1	38	424	0.2	39
Nebraska	218	1,063	2.3	16	53,521	2.6	13	5,962	2.4	15	Arizona	12	72	0.2	39	2,392	0.1	39	425	0.2	38
Tennessee	661	1,472	3.2	13	51,913	2.5	14	6,736	2.6	12	South Carolina	30	70	0.2	40	2,147	0.1	40	342	0.1	41
Oklahoma	227	958	2.1	17	49,844	2.4	15	5,684	2.2	17	Mississippi	54	61	0.1	42	2,092	0.1	41	195	0.1	45
Kentucky	533	1,584	3.5	10	45,774	2.2	16	6,193	2.4	14	Delaware	56	95	0.2	36	2,056	0.1	42	390	0.2	40
Michigan	345	1,128	2.5	15	44,145	2.1	17	5,959	2.4	16	Wyoming	28	37	0.1	45	1,411	0.1	43	228	0.1	43
Oregon	116	822	1.8	19	42,550	2.1	18	4,748	1.9	19	Louisiana	17	48	0.1	44	1,384	0.1	44	196	0.1	44
Virginia	537	937	2.1	18	36,154	1.8	19	5,226	2.1	18	New Mexico	30	66	0.1	41	1,324	0.1	45	232	0.1	42
North Dakota	87	568	1.2	21	29,282	1.4	20	3,059	1.2	21	Rhode Island	25	29	0.1	46	1,133	0.1	46	155	0.1	46
North Carolina	374	629	1.4	20	24,268	1.2	21	3,213	1.3	20	Nevada	10	25	0.1	47	1,116	0.1	47	125	(1)	47
Iowa	189	509	1.1	22	21,325	1.0	22	2,712	1.1	22	Dist. Columbia	3	23	0.1	48	901	(1)	48	95	(1)	49
Colorado	120	490	1.1	23	19,954	1.0	23	2,357	0.9	25	Florida	27	52	0.1	43	568	(1)	49	98	(1)	48
Maryland	247	478	1.1	24	19,004	0.9	24	2,647	1.0	23											
Montana	69	360	0.8	26	10,386	0.8	25	2,204	0.9	26											

<sup>1</sup> Less than one-tenth of 1 per cent.

TABLE 4.—MERCHANT MILLS—PERSONS ENGAGED IN THE INDUSTRY: 1919, 1914, AND 1909.

CLASS.	Census year.	Total.	Male.	Fe-male.	PER CENT OF TOTAL.		CLASS.	Census year.	Total.	Male.	Fe-male.	PER CENT OF TOTAL.	
					Male.	Fe-male.						Male.	Fe-male.
All classes	1919	75,769	70,804	4,965	93.4	6.6	Clerks and other subordinate salaried employees	1919	12,224	8,834	3,390	72.3	27.7
	1914	65,635	62,794	2,841	95.7	4.3		1914	8,904	7,008	1,896	73.7	21.3
	1909	66,054	63,492	2,562	96.1	3.9		1909	7,838	6,284	1,554	80.2	19.8
Proprietors and officials	1919	18,064	17,480	584	96.8	3.2	Wage earners (average number)	1910	45,435	44,446	989	97.8	2.2
	1914	17,013	16,575	438	97.4	2.6		1914	39,612	39,135	507	98.7	1.3
	1909	18,763	18,286	477	97.5	2.5		1909	39,320	38,796	524	98.7	1.3
Proprietors and firm members	1919	11,937	11,406	471	96.1	3.9	16 years of age and over	1919	45,435	44,446	989	97.8	2.2
	1914	12,669	12,264	405	96.8	3.2		1914	39,612	39,135	507	98.7	1.3
	1909	14,570	14,111	459	96.8	3.2		1909	39,320	38,796	524	98.7	1.3
Salaried officers of corporations	1919	2,541	2,465	76	97.0	3.0	Under 16 years of age	1919	46	44	2	95.7	4.3
	1914	1,743	1,719	24	98.6	1.4		1914	76	76	7	100.0	0
	1909	1,486	1,473	13	99.1	0.9		1909	133	126	7	94.7	5.3
Superintendents and managers	1919	3,586	3,549	37	99.0	1.0							
	1914	2,601	2,592	9	99.7	0.3							
	1909	2,707	2,702	5	99.8	0.2							

## MANUFACTURES.

TABLE 5.—MERCHANT MILLS—WAGE EARNERS, BY MONTHS, FOR SELECTED STATES: 1919.

[The month of maximum employment for each state is indicated by **bold-faced** figures and that of minimum employment by *italic* figures.]

STATE.	Average number employed during year.	NUMBER EMPLOYED ON 15TH DAY OF THE MONTH OR NEAREST REPRESENTATIVE DAY.											Per cent minimum is of maximum.	
		January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	
United States:														
1919.....	45,481	45,123	42,837	42,170	43,056	43,018	42,261	43,434	46,941	48,822	49,378	49,330	49,393	85.4
Males.....	44,400	44,026	41,950	41,912	42,180	42,212	41,447	42,609	45,889	47,600	48,231	48,183	48,241	85.6
Females.....	991	1,097	887	867	876	896	814	825	1,052	1,222	1,147	1,147	1,152	66.0
1914.....	39,718	39,281	39,140	39,058	38,324	37,921	38,114	39,580	40,526	41,684	41,234	41,028	40,743	91.0
1909.....	39,453	39,120	39,281	39,154	37,776	37,466	39,011	38,021	39,629	40,887	41,702	41,898	41,600	88.1
California.....	1,779	1,822	1,710	1,615	1,631	1,646	1,637	1,800	1,773	1,835	1,894	2,005	1,980	80.5
Colorado.....	490	479	471	427	491	506	400	412	500	540	539	553	556	71.9
Illinois.....	2,740	2,680	2,597	2,567	2,589	2,579	2,577	2,701	2,875	2,937	2,934	2,934	2,919	87.4
Indiana.....	2,280	2,263	2,182	2,087	2,170	2,185	2,084	2,227	2,336	2,473	2,463	2,432	2,357	84.3
Iowa.....	509	518	507	503	493	477	476	475	484	497	542	560	576	82.5
Kansas.....	3,493	3,349	3,073	3,055	3,075	3,189	3,078	3,181	3,871	4,053	4,051	3,999	3,971	75.2
Kentucky.....	1,584	1,525	1,506	1,423	1,477	1,487	1,551	1,650	1,730	1,725	1,667	1,626	1,632	82.3
Maryland.....	478	438	439	445	448	448	465	478	503	521	515	512	524	83.6
Michigan.....	1,128	1,266	1,015	1,095	1,078	1,038	1,022	1,051	1,129	1,172	1,211	1,216	1,213	80.7
Minnesota.....	6,049	6,228	5,645	5,607	5,881	5,967	5,822	5,715	5,972	6,261	6,486	6,500	6,594	86.2
Missouri.....	3,015	2,909	2,783	2,775	2,765	2,752	2,782	2,815	3,334	3,583	3,292	3,210	3,210	76.0
Montana.....	360	397	399	405	398	361	347	244	327	348	356	368	370	60.2
Nebraska.....	1,063	1,070	1,001	1,016	1,005	994	981	1,012	1,092	1,101	1,139	1,150	1,185	82.1
New York.....	3,012	3,106	2,795	2,625	2,870	2,875	2,809	2,860	3,051	3,239	3,322	3,292	3,300	79.0
North Carolina.....	629	624	622	613	601	601	594	610	619	632	663	671	662	88.5
North Dakota.....	568	580	584	551	547	551	546	538	555	600	619	592	553	86.9
Ohio.....	2,122	2,004	1,937	2,003	2,067	2,030	2,033	2,022	2,280	2,281	2,243	2,252	2,272	84.9
Oklahoma.....	958	911	896	876	856	763	772	989	1,098	1,092	1,070	1,084	1,089	69.5
Oregon.....	822	855	826	824	785	760	690	652	830	848	895	910	959	68.0
Pennsylvania.....	2,198	2,151	2,153	2,152	2,151	2,150	2,170	2,156	2,151	2,213	2,285	2,315	2,349	90.8
Tennessee.....	1,474	1,471	1,385	1,315	1,344	1,299	1,297	1,552	1,610	1,611	1,657	1,570	1,544	78.3
Texas.....	1,567	1,489	1,473	1,428	1,418	1,438	1,394	1,573	1,677	1,703	1,711	1,703	1,781	77.8
Virginia.....	937	904	905	905	891	902	900	937	971	994	992	970	967	89.6
Washington.....	1,536	1,473	1,468	1,360	1,459	1,449	1,418	1,332	1,417	1,688	1,768	1,823	1,771	72.8
Wisconsin.....	1,348	1,212	1,187	1,221	1,341	1,344	1,350	1,215	1,383	1,442	1,558	1,460	1,454	76.2

TABLE 6.—MERCHANT MILLS—AVERAGE NUMBER OF WAGE EARNERS, BY PREVAILING HOURS OF LABOR PER WEEK, FOR SELECTED STATES: 1919 AND 1914.

STATE.	Census year.	Total.	IN ESTABLISHMENTS WHERE THE PREVAILING HOURS OF LABOR PER WEEK WERE—							
			44 and under.	Between 44 and 48.	48.	Between 48 and 54.	54.	Between 54 and 60.	60.	Over 60.
United States.....	1919	45,481	859	48	16,597	723	3,636	2,236	16,182	5,200
	1914	39,718	(2)	(2)	3,414	355	2,949	1,331	22,714	8,955
	1909	33,453	(2)	(2)	3,395	591	2,602	1,075	19,060	12,130
California.....	1910	1,779	4	(2)	1,434	42	230	14	44	11
	1914	1,067	(2)	(2)	34	46	136	96	745	10
Colorado.....	1919	490	30	(2)	14	34	94	5	395	13
	1914	393	(2)	(2)	9	4	5	4	64	311
Illinois.....	1919	2,740	144	(2)	710	168	326	119	1,111	162
	1914	2,398	(2)	(2)	97	4	111	82	1,294	810
Indiana.....	1919	2,280	23	(2)	624	10	157	100	1,066	298
	1914	2,281	(2)	(2)	80	15	52	36	1,440	658
Iowa.....	1919	509	3	(2)	112	9	30	3	264	88
	1914	790	(2)	(2)	26	2	15	.....	655	92
Kansas.....	1919	3,493	7	(2)	1,612	3	116	158	1,118	470
	1914	2,357	(2)	(2)	61	1	34	2	1,377	882
Kentucky.....	1919	1,584	31	(2)	426	15	82	31	824	175
	1914	1,447	(2)	(2)	321	15	48	16	746	301
Maryland.....	1919	478	16	(2)	9	8	25	20	213	174
	1914	473	(2)	(2)	9	2	8	11	274	169
Michigan.....	1919	1,128	3	(2)	146	13	66	63	821	12
	1914	1,370	(2)	(2)	80	14	87	19	903	267
Minnesota.....	1919	6,049	16	(2)	4,800	29	100	249	646	299
	1914	4,561	(2)	(2)	1,458	.....	904	18	1,646	338
Missouri.....	1919	3,015	65	(2)	773	13	174	181	1,125	681
	1914	2,096	(2)	(2)	116	5	104	11	1,049	811
Montana.....	1919	360	(2)	(2)	210	.....	97	.....	46	7
	1914	256	(2)	(2)	96	.....	95	.....	63	2
Nebraska.....	1919	1,063	7	(2)	152	6	47	44	498	329
	1914	682	(2)	(2)	14	7	18	4	410	223

<sup>1</sup> Includes 48 and under for 1914 and 1909.<sup>2</sup> Corresponding figures not available.

# FLOUR-MILL AND GRISTMILL PRODUCTS.

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TABLE 6.—MERCHANT MILLS—AVERAGE NUMBER OF WAGE EARNERS, BY PREVAILING HOURS OF LABOR PER WEEK, FOR SELECTED STATES: 1919 AND 1914—Continued.

STATE.	Census year.	Total.	IN ESTABLISHMENTS WHERE THE PREVAILING HOURS OF LABOR PER WEEK WERE—							
			44 and under.	Between 44 and 48.	48. <sup>1</sup>	Between 48 and 54.	54.	Between 54 and 60.	60.	Over 60.
New York.....	1919	3,012			1,286	50	453	212	976	5
	1914	3,070	(2)	(2)	76	47	232	115	2,577	3
North Carolina.....	1919	629		21	1	18	13	11	92	36
	1914	588	(2)	(2)	11	5	5	15	390	188
North Dakota.....	1919	568		7		371	1	45		25
	1914	424						13	119	93
Ohio.....	1919	2,122		23	7	429	27	171	68	1,289
	1914	2,363	(2)	(2)	115	18	216	105	1,683	226
Oklahoma.....	1919	958		1		331	1	31	7	214
	1914	700	(2)	(2)	27	3	30		252	388
Oregon.....	1919	822				399	2	49	166	203
	1914	450	(2)	(2)	50	3	14		233	
Pennsylvania.....	1919	2,198		139	9	234	84	198	370	906
	1914	2,595	(2)	(2)	80	69	327	262	1,334	523
Tennessee.....	1919	1,472		157		15	3	72	34	495
	1914	1,497	(2)	(2)	47	4	24	102	484	696
Texas.....	1919	1,567		2		674	4	162	25	347
	1914	1,300	(2)	(2)	22	1	103	94	475	353
Virginia.....	1919	937		17		42	10	34	45	512
	1914	1,082	(2)	(2)	53	3	5	63	730	277
Washington.....	1919	1,536		1	6	1,129	2	79	300	19
	1914	928	(2)	(2)	156	59	8	43	655	7
Wisconsin.....	1919	1,348		1		257	2	262	29	788
	1914	1,116	(2)	(2)	108	1	76	6	722	9
										203

<sup>1</sup> Includes 48 and under for 1914 and 1909.

<sup>2</sup> Corresponding figures not available.

TABLE 7.—MERCHANT MILLS—SIZE OF ESTABLISHMENTS, BY AVERAGE NUMBER OF WAGE EARNERS, FOR SELECTED STATES: 1919.

STATE.	TOTAL.		ESTABLISHMENTS EMPLOYING—																			
	Establishments.	Wage earners (average number).	No wage earners.		1 to 5 wage earners, inclusive.		6 to 20 wage earners, inclusive.		21 to 50 wage earners, inclusive.		51 to 100 wage earners, inclusive.		101 to 250 wage earners, inclusive.		251 to 500 wage earners, inclusive.		501 to 1,000 wage earners, inclusive.		Over 1,000 wage earners.			
			Establishments.	Establishments.	Establishments.	Wage earners.	Establishments.	Establishments.	Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Establishments.	Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.		
United States, 1919.	10,708	45,481	3,181	6,220	11,325	922	9,462	251	7,613	5,774	42	5,852	7	2,222	1	601	2	2,432				
	1914.	10,788	1,887	7,007	14,306	953	9,625	195	6,046	4,515	16	2,202	3	1,191	2	1,773						
California.....	134	1,779	13	88	127	19	202	7	226	2	139	3	539	2	546							
Colorado.....	120	490	22	75	109	19	205	3	115	1	61											
Illinois.....	322	2,740	101	123	283	64	724	22	652	7	483	5	598									
Indiana.....	450	2,280	57	329	681	43	403	13	368	5	393	3	435									
Iowa.....	180	509	40	133	212	12	141	3	104	1	52											
Kansas.....	385	3,493	82	174	315	81	947	36	1,077	8	547	4	607									
Kentucky.....	533	1,584	180	312	622	31	269	6	173	2	117	1	128	1	275							
Maryland.....	247	478	88	142	240	15	142	1	21	1	75											
Michigan.....	315	1,128	85	226	432	26	254	3	90	5	352											
Minnesota.....	248	6,049	23	151	334	31	340	23	661	12	823	4	530	2	703			2	2,432			
Missouri.....	690	3,015	236	361	588	63	649	20	609	5	361	4	493	1	315							
Montana.....	69	360	6	48	64	11	119	3	115	1	62											
Nebraska.....	218	1,063	42	142	298	25	295	6	184	1	74	2	212									
New York.....	716	3,012	201	443	771	52	507	14	450	4	300			1	383	1	601					
North Carolina.....	374	629	129	227	407	14	111	4	111													
North Dakota.....	87	568	14	51	99	15	130	5	207	2	132											
Ohio.....	577	2,122	113	385	827	61	533	13	388	4	261	1	113									
Oklahoma.....	227	658	92	99	175	26	265	6	212	4	306											
Oregon.....	116	822	28	63	150	17	182	5	144	1	66	2	250									
Pennsylvania.....	1,138	2,108	320	749	1,283	62	503	4	95	2	118	1	109									
Tennessee.....	661	1,472	332	291	521	28	282	6	204	1	62	3	403									
Texas.....	229	1,567	59	111	215	31	365	14	429	6	435	1	123									
Virginia.....	537	837	224	284	511	24	215	4	109			1	102									
Washington.....	119	1,536	10	72	148	22	276	8	240	3	222	4	650									
Wisconsin.....	221	1,348	38	140	260	23	230	6	152	2	187	3	510									

## MANUFACTURES.

TABLE 8.—MERCHANT MILLS—SIZE OF ESTABLISHMENTS, BY VALUE OF PRODUCTS: 1919, 1914, AND 1909.

VALUE OF PRODUCT.	NUMBER OF ESTABLISHMENTS.			AVERAGE NUMBER OF WAGE EARNERS.			VALUE OF PRODUCTS.			VALUE ADDED BY MANUFACTURE.			
	1919	1914	1909	1919	1914	1909	1919	1914	1909	1919	1914	1909	
All classes.....	10,708	10,788	11,691	45,481	39,718	39,453	\$2,052,434,385	\$877,679,709	\$883,584,405	\$253,253,398	\$125,409,688	\$116,007,926	
Less than \$5,000.....	1,499	1,576	1,651	186	961	847	4,024,716	5,347,012	4,781,883	806,577	1,245,806	982,213	
\$5,000 to \$20,000.....	3,080	2,175	4,333	1,659	4,598	4,489	36,392,972	47,675,997	50,280,039	6,735,789	9,375,467	9,314,478	
\$20,000 to \$100,000.....	4,151	3,529	4,411	7,380	9,680	11,370	189,254,525	147,254,021	187,287,491	30,885,551	24,841,349	30,761,856	
\$100,000 to \$500,000.....	1,331	899	1,158	{ 8,062	12,464	12,788	{ 275,539,175	193,837,516	{ 172,601,000	{ 107,237,655	{ 322,187,333	{ 37,340,124	
\$500,000 to \$1,000,000.....	249	156	1,158	{ 4,042	10,029	1,374,531,997	376,320,608	319,047,659	156,621,918	50,906,557	21,363,439	39,404,509	39,418,431
\$1,000,000 and over.....	398	153	138	24,152	12,015	10,029	1,374,531,997	376,320,608	319,047,659	156,621,918	50,906,557	21,363,439	35,550,948

## PER CENT DISTRIBUTION.

All classes.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	14.0	17.4	14.1	0.4	2.4	2.1	0.2	0.6	0.5	0.3	1.0	0.8
Less than \$5,000.....	28.8	38.7	37.1	3.6	11.4	11.4	1.8	5.4	5.7	2.7	7.5	8.0
\$5,000 to \$20,000.....	38.8	32.7	37.7	16.2	24.4	28.6	9.2	16.8	21.2	12.0	19.8	26.5
\$20,000 to \$100,000.....	12.4	8.3	9.9	{ 17.7	31.4	32.4	{ 13.4	22.1	{ 36.5	{ 14.7	31.1	34.0
\$100,000 to \$500,000.....	2.3	1.4	1.4	{ 8.9	8.4	12.2	{ 8.4	12.2	{ 6.1	{ 8.4	40.6	30.6
\$500,000 to \$1,000,000.....	3.7	1.4	1.2	53.1	30.2	25.4	67.0	42.9	36.1	61.8		
\$1,000,000 and over.....												

TABLE 9.—MERCHANT MILLS—CHARACTER OF OWNERSHIP, FOR SELECTED STATES: 1919 AND 1914.

STATE.	Cen-sus year.	NUMBER OF ESTABLISHMENTS OWNED BY—			AVERAGE NUMBER OF WAGE EARNERS.			VALUE OF PRODUCTS.			VALUE ADDED BY MANUFACTURE.							
		In establishments owned by—			Percent of total.			Of establishments owned by—			Per cent of total.							
		Individ-uals.	Cor-pora-tions.	All oth-ers.	Total.	Individ-uals.	Cor-pora-tions.	All oth-ers.	Total.	Individ-uals.	Corpora-tions.	All oth-ers.	Individ-uals.	Cor-pora-tions.	All oth-ers.			
United States..	1919	4,711	2,667	3,330	45,481	5,293	34,811	5,347	11.6	70.6	11.8	\$2,052,434,385	\$152,127,809	\$1,713,800,083	\$186,500,493	7.4	83.5	9.1
	1914	5,426	2,264	3,008	39,718	7,831	25,211	6,676	19.7	63.5	16.8	877,679,709	113,784,139	645,047,622	118,847,948	13.0	73.5	13.5
	1909	6,908	2,271	3,512	39,453	9,053	22,880	7,520	22.9	58.0	19.1	883,584,405	149,987,044	588,189,883	145,407,478	17.0	66.6	16.5
California.....	1919	25	90	19	1,779	28	1,705	46	1.6	97.8	2.6	65,448,352	1,061,692	62,902,291	1,484,369	1.6	98.1	2.3
	1914	31	70	22	1,067	50	989	28	4.7	92.7	2.6	24,078,735	1,302,460	22,004,744	5.4	91.4	3.2	
Colorado.....	1919	21	86	13	401	19	450	21	3.9	91.9	4.3	19,054,119	592,436	18,701,087	659,996	3.0	93.7	3.3
	1914	15	58	10	393	18	364	11	4.6	92.6	2.8	7,355,033	7,048,962	190,687	3.9	93.5	2.5	
Illinois.....	1919	131	106	86	2,740	244	2,258	238	8.9	82.4	8.7	116,502,915	5,513,169	102,149,917	8,899,829	4.7	87.6	7.6
	1914	193	97	116	2,398	420	1,660	318	17.5	69.2	13.3	49,493,224	7,281,852	37,022,238	1,189,134	14.7	74.8	10.5
Indiana.....	1919	202	132	116	2,283	320	1,674	286	14.0	73.4	12.5	75,111,435	7,332,454	60,545,702	7,233,279	9.8	80.6	9.6
	1914	218	124	170	2,281	412	1,416	453	18.1	62.1	19.9	37,488,223	4,542,704	27,284,751	5,060,708	12.1	72.8	15.1
Iowa.....	1919	92	47	50	509	87	337	85	17.1	66.2	16.7	21,321,678	2,846,386	15,758,411	2,719,881	13.3	73.9	12.8
	1914	117	40	70	709	124	531	135	15.7	67.2	17.1	14,330,576	1,771,662	10,505,846	1,669,268	12.4	73.9	13.7
Kansas.....	1919	110	167	108	3,493	176	2,962	355	5.0	84.8	10.2	208,581,300	3,994,058	187,284,398	15,602,844	1.9	90.5	7.5
	1914	142	119	99	2,357	261	1,767	330	11.0	75.0	14.0	72,894,736	5,211,023	58,562,532	7,208,084	7.2	80.3	12.5
Kentucky.....	1919	264	69	200	1,584	251	915	418	15.8	57.8	26.4	45,773,795	4,572,932	30,308,782	10,892,084	10.0	66.2	23.5
	1914	177	87	178	1,447	262	770	415	18.1	53.2	28.7	21,220,203	2,575,957	13,322,434	5,320,812	12.1	62.8	25.1
Maryland.....	1919	164	30	53	478	148	230	100	31.0	48.1	20.9	19,004,189	3,970,188	10,402,781	4,631,200	20.9	54.7	24.4
	1914	174	32	41	473	211	102	70	44.6	40.6	14.8	8,163,869	3,684,638	3,541,657	937,545	4.1	43.4	11.5
Michigan.....	1919	146	85	114	1,128	203	746	179	18.0	66.1	16.9	41,144,434	6,572,213	30,150,339	7,421,882	14.9	68.3	16.8
	1914	203	83	141	1,370	332	731	317	24.2	53.4	22.4	27,384,474	5,608,028	16,384,336	5,388,110	20.5	58.8	19.7
Minnesota.....	1919	67	131	50	6,049	135	5,749	165	2.2	95.0	2.7	381,248,891	5,641,000	366,206,121	9,341,770	1.5	96.1	2.5
	1914	105	105	76	4,564	282	3,954	298	6.2	87.3	6.5	148,243,708	5,399,850	134,861,980	7,381,872	4.0	91.0	5.0
Missouri.....	1919	315	179	196	3,015	259	2,539	217	8.6	84.2	7.2	113,297,359	5,390,869	100,588,509	6,367,981	5.8	88.7	5.6
	1914	284	152	205	2,096	303	1,345	358	18.8	64.2	17.1	38,080,309	4,328,928	27,838,468	6,518,913	11.2	72.0	16.9
Montana.....	1919	17	43	9	360	26	316	18	7.2	87.8	5.0	16,386,055	532,151	14,415,056	1,118,843	5.2	88.0	6.8
	1914	8	22	3	250	13	237	6	5.1	92.6	2.3	4,890,275	208,925	4,570,000	111,350	4.3	93.4	2.3
Nebraska.....	1919	87	71	60	1,063	130	782	151	12.2	73.6	14.2	3,868,197	42,615,278	7,037,913	7,215,278	7.2	79.6	13.1
	1914	95	55	61	682	155	390	137	22.7	57.2	20.1	15,022,126	2,459,519	10,093,307	2,469,300	16.4	67.2	16.4
New York.....	1919	369	136	211	3,012	417	2,292	313	13.8	76.1	10.1	155,272,104	13,490,187	131,042,404	10,139,513	8.7	84.8	6.5
	1914	515	130	246	3,070	650	2,014	406	21.2	65.6	13.2	77,406,764	10,500,186	52,782,021	8,097,496	13.7	75.9	10.5
North Carolina.....	1919	192	73	107	629	191	322	116	31.4	51.2	18.4	24,258,213	5,609,155	14,463,627	4,180,431	23.1	59.6	17.2
	1914	136	54	103	588	221	100	177	37.6	32.3	30.1	8,963,501	2,640,852	3,784,383	2,338,286	29.5	42.2	28.3
North Dakota.....	1919	23	49	15	568	32	501	35	5.6	88.2	6.2	29,282,056	1,073,858	27,093,305	1,112,893	3.7	92.5	3.8
	1914	13	37	9	424	38	354	32	0.0	73.5	7.5	12,095,772	1,035,772	10,345,596	678,537	0.5	86.0	5.6
Ohio.....	1919	229	143	214	2,122	378	1,338	406	17.8	63.1	19.1	89,396,619	10,294,759	66				

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TABLE 10.—MERCHANT MILLS—NUMBER AND HORSEPOWER OF TYPES OF PRIME MOVERS: 1919, 1914, AND 1909.

POWER.	NUMBER OF ENGINES OR MOTORS.			HORSEPOWER.					
	1919	1914	1909	Amount.			Per cent distribution.		
				1919	1914	1909	1919	1914	1909
Primary power, total.....	20,766	18,048	18,080	876,405	822,384	853,584	100.0	100.0	100.0
Owned.....	11,099	14,136	16,589	611,967	708,965	800,333	69.8	86.2	93.8
Steam <sup>1</sup> .....	2,982	4,580	6,758	329,559	403,186	473,571	37.6	49.0	55.5
Engines.....	2,910	(2)	(2)	302,826	(2)	(2)	34.0	-----	-----
Turbines.....	66	(2)	(2)	26,703	(2)	(2)	3.1	-----	-----
Internal-combustion engines.....	3,427	2,922	2,540	96,291	76,451	62,651	11.0	9.3	7.3
Water wheels, turbines, and motors.....	4,090	6,634	7,291	186,087	229,323	264,131	21.2	27.9	30.9
Rented.....	9,667	3,912	1,491	264,438	113,419	53,201	30.2	13.8	6.2
Electric.....	9,667	3,912	1,491	263,497	112,441	49,901	30.1	13.7	5.8
Other.....				941	978	3,300	0.1	0.1	0.4
Electric.....	11,493	4,919	2,026	309,610	150,248	67,066	100.0	100.0	100.0
Rented.....	9,667	3,912	1,491	263,497	112,441	49,901	85.1	74.8	74.4
Generated by establishments reporting.....	1,826	1,007	1,535	46,113	37,807	17,165	14.9	25.2	25.6

<sup>1</sup> Figures for horsepower include for 1909 the amount reported under the head of "Other" owned power.

<sup>2</sup> Not reported separately.

TABLE 11.—MERCHANT MILLS—FUEL CONSUMED, FOR SELECTED STATES: 1919 AND 1914.

STATE.	Cen-	COAL.			STATE.	Cen-	COAL.			Gasoline and other volatile oils (barrels).	Gas (1,000 cubic feet).	
		Anthra-	Bitu-	fuel			Anthra-	Bitu-	Coke (tons, 2,000 lbs.).	fuel	(barrels).	(1,000 cubic feet).
		cite (tons, 2,240 lbs.).	minous (tons, 2,000 lbs.).	(barrels).			(tons, 2,240 lbs.).	minous (tons, 2,000 lbs.).	(tons, 2,000 lbs.).	(barrels).		
United States....	1919	57,034	1,582,494	5,134	Nebraska.....	1919	140	31,705	15	21,474	1,499	-----
	1914	56,953	1,809,968	13,941	441,693	(1)	1,627,252	50	38,067	4	22,059	300
Per cent of increase <sup>2</sup> .....	0.1	-12.6	-63.2	65.3								
California.....	1919	60	70,464	713	4,722	Nebraska.....	1914	140	31,705	15	21,474	1,499
	1914	237	84,712	(1)	3,522	New York.....	1919	2,937	51,219	103	2,819	71,740
Colorado.....	1919	168	30,003	30	620	North Carolina.....	1919	114	6,638	2	1,630	56,326
	1914	20	20,753	2,476	785	(1)	1914	155	7,083	70	1,610	
Illinois.....	1919	269	179,078	964	1,087	North Dakota.....	1919	283	79,962	2	814	970
	1914	6	200,412	558	1,726	(1)	1914	1,062	64,547	(1)	686	
Indiana.....	1919	132	150,958	1,733	3,154	Ohio.....	1919	100	105,017	135	2,315	212,076
	1914	1,268	189,101	524	2,224	(1)	1914	880	148,071	330	3,082	238,027
Iowa.....	1919	515	28,024	7	3,063	Oklahoma.....	1919	50	23,504	54,952	1,192	250,652
	1914	20	52,346	2,005	2,302	(1)	1914	-----	27,854	19,435	(1)	250,150
Kansas.....	1919	8,845	72,824	0	293,650	Oregon.....	1919	5	281	50	2,554	18
	1914	20	110,808	1,314	1,85,373	(1)	1914	-----	183	3,628	(1)	
Kentucky.....	1919	617	73,958	2,185	7,096	Pennsylvania.....	1919	30,722	36,363	84	1,369	2,415
	1914	-----	78,911	4,967	(1)	1914	34,946	54,344	273	3,287	(1)	125,686
Maryland.....	1919	1,803	10,683	-----	2,156	Tennessee.....	1919	1,996	64,382	83	2,306	50
	1914	2,470	14,028	-----	1,136	(1)	1914	-----	61,272	700	1,835	25
Michigan.....	1919	407	46,841	104	2,386	Texas.....	1919	62	19,507	1,030	87,413	141,696
	1914	529	59,027	1,074	2,985	(1)	1914	-----	62,944	748	47,992	158,993
Minnesota.....	1919	683	225,748	114	7,579	Virginia.....	1919	1,020	11,800	11	4,948	3,066
	1914	3,017	249,002	54	1,601	(1)	1914	349	18,308	2,037	(1)	1,125
Missouri.....	1919	302	206,350	36	28,436	Washington.....	1919	112	1,748	9	13,650	220
	1914	74	134,496	2	4,919	(1)	1914	6	1,878	-----	19,683	(1)
Montana.....	1919	1	16,500	330	478	Wisconsin.....	1919	4,796	34,225	40	1,486	922
	1914	-----	-----	-----	(1)	1914	2,874	45,643	157	1,612	(1)	
All other states.....	1919	-----	-----	373	602	Tennessee.....	1919	5,865	65,887	254	10,271	24,702
	1914	-----	-----	(1)	-----	(1)	1914	3,642	71,002	1,281	15,286	(1)

<sup>1</sup> Included in fuel oils.

<sup>2</sup> A minus sign (−) denotes decrease.

## MANUFACTURES.

## SPECIAL STATISTICS.

The special schedule used in collecting the statistics for the flour-mill and gristmill industry required details of the quantity of the different kinds of grain ground or milled and the quantity and value of the different products manufactured. In addition to the figures shown for the industry, flour-mill and gristmill products to the value of \$46,515,270 were reported by establishments engaged primarily in other industries. Also a large quantity of grain was used by establishments whose chief products were breakfast foods, classified in the general reports on manufactures as

"Food preparations." While no figures are available to show the kinds and quantities of grain used in other branches of manufacture, there were 64,939,315 bushels of corn and 186,039 bushels of wheat consumed in the manufacture of glucose and starch alone.

**Merchant and custom mills—grain ground and value of products.**—Table 12 shows the quantity of each of the principal kinds of grain ground and the quantity and value of the products manufactured for all mills for 1919 and 1909, for merchant mills for 1919, 1914, and 1909, and for custom mills for 1919 and 1909.

TABLE 12.—MERCHANT AND CUSTOM MILLS—DETAILED STATISTICS OF QUANTITY OF GRAIN GROUND AND QUANTITY AND VALUE OF PRODUCTS: 1919 AND 1909.

	ALL MILLS.		MERCHANT MILLS.			CUSTOM MILLS.	
	1919	1909	1919	1914	1909	1919	1909
<b>GRAIN GROUND.</b>							
Total.....bushels..	888,305,973	872,950,743	830,026,293	818,929,321	806,247,961	58,279,680	60,702,752
Wheat.....bushels..	618,667,518	503,468,556	612,552,471	545,728,431	496,480,314	6,105,047	6,988,242
Corn.....bushels..	137,426,486	244,547,967	113,760,971	180,115,704	200,281,237	23,665,515	35,266,730
Rye.....bushels..	17,693,250	13,374,095	15,951,961	12,813,831	11,503,969	1,741,289	1,870,126
Buckwheat.....bushels..	5,588,760	8,394,120	4,764,830	5,478,045	7,156,062	823,938	1,238,058
Barley.....bushels..	28,339,013	30,639,401	21,151,343	20,288,366	24,509,770	7,187,670	6,129,631
Oats.....bushels..	76,471,266	63,301,092	58,579,943	50,227,050	50,241,598	17,891,323	13,059,494
Other grains.....bushels..	4,119,674	9,225,512	3,254,774	4,277,804	7,073,011	864,900	2,150,501
<b>PRODUCTS.</b>							
Total.....value..	\$2,147,218,913	\$938,699,958	\$2,052,434,385	\$877,670,709	\$883,584,405	\$94,784,528	\$55,115,553
Wheat flour.....barrels..	133,670,672	107,108,461	132,465,604	116,403,770	105,756,645	1,205,068	1,351,816
Corn meal and corn flour.....barrels..	\$1,450,333,051	\$557,814,979	\$1,426,444,111	\$543,839,568	\$550,116,254	\$13,908,040	\$7,698,725
Rye flour.....barrels..	14,789,976	27,188,352	10,682,052	16,327,903	21,552,737	4,107,024	5,635,615
Buckwheat flour.....pounds..	\$113,039,114	\$87,058,630	\$82,063,500	\$54,963,301	\$66,941,095	\$31,599,554	\$20,147,435
Barley meal.....pounds..	2,575,542	1,591,726	2,527,752	1,937,355	1,532,139	47,790	59,587
Hominy and grits.....pounds..	\$21,676,568	\$8,644,659	\$21,235,808	\$7,845,213	\$8,388,538	\$441,030	\$261,121
Oatmeal.....pounds..	104,677,008	200,950,917	90,137,407	125,622,189	176,081,891	14,539,601	24,878,026
Bran and middlings.....tons..	\$6,147,639	\$5,384,616	\$5,244,539	\$3,754,857	\$4,663,561	\$903,150	\$721,055
Feed and offal.....tons..	100,362,712	33,649,182	91,809,114	14,000,789	28,550,952	8,553,598	5,098,230
Breakfast foods.....pounds..	\$3,485,054	\$580,654	\$3,217,464	\$242,343	\$486,000	\$267,590	\$94,654
All other cereal products.....value..	292,290,973	837,333,466	288,523,592	870,384,493	827,987,702	3,705,383	9,345,764
All other products.....value..	\$9,395,290	\$12,689,962	\$9,247,224	\$13,767,561	\$12,509,493	\$148,056	\$180,469
All other cereal products.....value..	37,457,699	28,120,649	30,451,551	31,451,551	9,337,050		
All other products.....value..	\$1,423,171	\$1,100,875	\$757,804		\$322,298		
All other cereal products.....value..	4,817,357	10,176,530	4,760,328	4,666,328	57,031		
All other products.....value..	\$214,196,066	\$250,141,439	\$211,435,518	\$104,702,735	\$230,356,342	\$2,760,543	\$25,755,097
All other cereal products.....value..	5,329,876	(1)	4,566,855	4,753,280	(1)	783,021	(1)
All other products.....value..	\$306,825,068	(1)	\$282,733,518	\$137,067,959	(1)	\$44,091,548	(1)
All other cereal products.....value..	97,250,673	96,531,073	92,076,056		719,000		
All other products.....value..	\$4,331,551	\$4,349,541	\$2,932,238		\$32,010		
All other cereal products.....value..	\$10,072,201	\$10,033,062	\$2,244,180		\$39,139		
All other products.....value..	\$5,603,792	\$5,333,165	\$5,562,000	\$12,128,122	\$270,627		\$226,997

<sup>1</sup> Not reported separately in 1909.

The total quantity of grain ground by all mills in 1919 represented an increase of 15,355,230 bushels, or 1.8 per cent, over the amount reported for 1909. For the merchant mills the increase was 23,778,332 bushels, or 2.9 per cent, but the quantity reported for the custom mills showed a decrease of 8,423,102 bushels, or 12.6 per cent. As the custom mills, as a rule, keep no exact records of the amount of grain ground, their reports as to this item are largely estimates based on the receipts for toll. Of the total quantity of grain ground both in 1919 and 1909, more than 90 per cent were reported by the merchant mills.

Wheat was the principal kind of grain used both in 1919 and 1909, the amount ground in 1919 being an increase of 115,198,962 bushels, or 22.9 per cent, over

that reported for 1909. The relative importance of wheat increased during the ten-year period, the proportion which it formed of the total quantity of grain reported being 69.6 per cent in 1919 and 57.7 per cent in 1909.

Corn was the next grain in importance, the quantity reported in 1919 represented 15.5 per cent of the total amount of grain used, but was a decrease of 107,121,481 bushels, or 43.8 per cent, as compared with the quantity reported for 1909, when it formed 28 per cent of the total amount of grain used.

Oats, barley, rye, and buckwheat, in the order named, ranked next in importance in number of bushels reported. From 1909 to 1919 there were increases in the quantity of oats and rye used of 20.8

# FLOUR-MILL AND GRISTMILL PRODUCTS.

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per cent and 32.6 per cent, respectively, while the quantity of barley showed a decrease of 7.5 per cent, and that for buckwheat 33.4 per cent.

Of the total quantity of grain ground in merchant mills in 1919, wheat constituted 73.8 per cent, corn 13.7 per cent, and oats 7.1 per cent; while in 1909 wheat formed 61.6 per cent of the total, corn 26 per cent, and oats 6.2 per cent. There was an increase of 23,778,332 bushels, or 2.9 per cent, in the quantity of all kinds of grain ground in these mills in 1919 as compared with the quantity ground in 1909.

While the schedule called for the selling value or price of the product at the mill, it was not always possible to obtain this value, and in some instances the amount received at the place of delivery was reported. Even when the selling prices at the point

of production were obtained, they were in some cases retail prices and in others wholesale rates. For this reason no attempt has been made to compute from the reported total values the average value per unit for the different classes of products.

The total quantity of wheat flour reported for 1919, 133,670,672 barrels, represents an increase of 26,562,211 barrels, or 24.8 per cent, over the quantity reported for 1909. In the production of corn meal and corn flour, however, a decrease of 12,398,376 barrels, or 45.6 per cent, is shown for the decade.

**Grain ground in merchant mills.**—Table 13 shows for merchant mills, for the United States and by states, the quantities of wheat and corn ground in 1919, 1914, and 1909, and also the quantities of other grains ground in 1919.

TABLE 13.—QUANTITY OF GRAIN GROUND IN MERCHANT MILLS, BY STATES: 1919, 1914, AND 1909.

STATE.	WHEAT (BUSHELS).			CORN (BUSHELS).			OTHER GRAIN (BUSHELS): 1919.				
	1919	1914	1909	1919	1914	1909	Rye.	Buck-wheat.	Barley.	Oats.	All other.
United States.....	612,502,471	545,728,431	496,480,314	113,760,971	180,115,704	209,281,237	15,951,961	4,764,830	21,151,343	53,579,943	3,174,125
Alabama.....	210,445	115,100	78,326	1,772,154	1,925,919	2,783,224	(1)	238,148	141,611	(1)	11,612
Arizona.....	688,738	385,508	385,183	192,581	8,758	8,550	(1)	602,485	(1)	(1)	
Arkansas.....	1,643,910	1,401,408	1,134,890	1,700,474	4,564,091	4,723,726	(1)	2,227,734	600,834	430,404	32,677
California.....	15,700,708	9,554,542	8,866,746	1,995,780	930,666	804,009	59,501	(1)	7,118,138	2,227,734	600,834
Colorado.....	6,942,507	5,737,849	4,574,480	1,335,577	1,367,084	1,570,185	40,051	531,263	(1)	(1)	
Connecticut <sup>1</sup> .....	2,614	718	16,141	1,191,027	1,984,451	2,139,404	13,095	540	11,636	332,149	(1)
Delaware.....	576,308	734,619	882,483	234,344	498,815	586,202	1,527	7,490	(1)	(1)	32
Florida.....	(1)	20	20	200,228	161,561	123,754	(1)	(1)	(1)	(1)	
Georgia.....	2,208,702	1,616,748	2,088,586	2,305,797	3,666,287	5,135,892	(1)	(1)	217,915	(1)	
Idaho.....	5,118,604	2,909,253	1,890,276	52,783	50,943	16,585	3,895	(1)	305,683	96,496	(1)
Illinois.....	33,430,497	31,020,794	30,303,512	7,951,542	10,257,035	12,637,221	804,094	173,941	627,165	4,863,433	72,967
Indiana.....	20,042,070	21,190,657	22,905,586	8,701,829	14,052,554	13,388,218	513,072	29,936	439,327	1,172,597	31,191
Iowa.....	5,925,297	7,117,783	7,063,273	1,797,818	3,344,173	3,350,442	99,087	87,512	154,495	1,355,180	(1)
Kansas.....	73,942,142	50,945,127	49,076,585	3,507,710	6,952,316	10,584,717	175,082	5,761	267,643	218,069	198,706
Kentucky.....	12,449,831	13,114,197	13,575,601	4,688,724	4,760,161	4,971,874	20,539	45,856	37,910	264,558	9,441
Maine.....	168,420	44,430	66,898	2,436,522	4,198,565	4,757,998	2,250	41,388	16,337	610,561	(1)
Maryland.....	5,705,777	5,310,157	5,429,008	849,411	1,610,070	1,967,086	38,201	73,270	23,079	73,877	18,638
Massachusetts.....	42,114	56,701	38,441	1,887,563	4,042,175	5,265,210	28,964	(1)	24,883	529,758	325,555
Michigan.....	12,020,886	14,621,038	16,733,707	2,372,083	5,395,035	1,336,257	303,423	668,110	2,814,630	3,594,284	1,736,037
Minnesota.....	130,865,360	124,339,078	104,042,909	1,620,600	3,092,696	3,440,937	5,513,501	63,921	3,594,284	1,736,037	34,163
Missouri.....	32,738,674	25,277,533	27,004,019	7,303,824	8,532,276	10,474,264	104,673	483,344	495,072	3,049,170	111,851
Montana.....	5,730,171	4,142,848	1,701,589	106,585	5,731	(1)	1,625	(1)	30,668	508,546	(1)
Nebraska.....	15,947,132	11,404,925	10,741,279	2,951,487	2,247,069	5,168,794	121,432	23,413	205,983	654,816	23,705
Nevada.....	397,384	193,019	294,075	(1)	(1)	5,527	(1)	54,686	32,102	(1)	
New Hampshire.....	407,149	402,325	400,548	960,363	2,208,037	2,921,923	5,493	2,822	19,581	555,803	(1)
New Jersey.....	594,466	832,821	1,377,248	1,195,596	2,447,371	3,336,651	510,829	55,107	23,070	546,830	187,188
New Mexico.....	454,222	290,889	259,944	19,950	25,779	77,686	(1)	(1)	6,281	(1)	
New York.....	43,336,537	38,185,270	30,073,407	10,359,388	21,065,163	21,593,807	1,242,223	1,241,497	1,123,243	13,028,699	35,711
North Carolina.....	6,227,571	4,703,195	3,715,264	2,668,332	2,638,134	2,749,135	20,460	1,875	(1)	175,098	(1)
North Dakota.....	10,058,580	10,396,683	8,821,071	60,172	55,827	94,809	6,186	(1)	243,375	339,281	23,248
Ohio.....	27,348,147	27,780,349	27,271,412	4,847,433	9,544,909	11,326,981	201,523	173,718	408,584	3,624,485	124,532
Oklahoma.....	15,756,681	9,590,056	10,074,282	2,977,938	5,576,923	8,329,146	14,064	(1)	273,903	329,471	53,604
Oregon.....	14,901,092	8,638,891	6,414,594	112,014	48,085	54,445	9,490	(1)	576,931	1,114,975	(1)
Pennsylvania.....	15,947,019	19,344,465	18,320,118	7,621,209	14,638,839	15,665,222	1,650,272	1,288,793	185,832	4,150,689	395,312
Rhode Island.....	164	505	170	522,692	818,543	1,103,956	434	(1)	79,466	(1)	
South Carolina.....	299,033	99,769	27,900	553,583	267,008	315,590	(1)	(1)	52,646	(1)	
South Dakota.....	3,004,992	4,488,397	4,697,391	89,014	153,557	208,873	7,663	1,072	118,181	155,671	54,168
Tennessee.....	13,122,128	14,578,618	14,359,868	6,013,632	8,023,114	9,971,656	282	4,455	132,040	893,627	9,715
Texas.....	21,337,622	18,978,767	10,243,203	5,000,082	8,026,359	9,961,386	8,687	(1)	164,508	732,955	234,549
Utah.....	2,686,917	2,524,748	2,258,841	40,108	35,709	47,883	4,864	(1)	81,092	319,264	(1)
Vermont.....	64,028	15,329	1,565	1,983,749	3,799,582	4,211,911	1,560	18,710	107,363	1,805,515	60,830
Virginia.....	10,408,458	10,232,083	9,672,288	3,210,689	5,127,104	5,876,745	73,065	38,578	60,592	140,776	1,414
Washington.....	20,836,116	17,506,736	12,854,599	1,144,345	475,381	352,969	48,897	(1)	1,040,686	1,980,380	180,531
West Virginia.....	2,928,138	2,535,501	3,086,082	2,018,614	3,299,908	3,299,377	81,685	113,553	23,783	440,459	43,700
Wisconsin.....	13,337,487	13,806,270	16,262,688	3,026,061	6,728,233	3,847,801	3,090,324	372,980	1,675,307	5,480,135	197,711
Wyoming.....	486,720	491,772	468,130	27,692	21,065	128,181	2,814	(1)	19,231	(1)	
All other states <sup>2</sup> .....	330,904	1,000	326,000	1,080,272	944,143	1,252,935	4,280	48,905	22,501	680,629	94,410

<sup>1</sup> Figures included with those for "All other states" to avoid disclosure of individual operators.

<sup>2</sup> Includes District of Columbia, Louisiana, and Mississippi.

## MANUFACTURES.

**Products of merchant mills.**—Table 14 shows for merchant mills, by states, the quantity and value of wheat flour and of corn meal and corn flour reported for 1919, 1914, and 1909. Table 15 gives, for 1919, similar statistics for rye flour, buckwheat flour, barley meal, hominy and grits, bran and middlings, and feed and offal.

Minnesota, the most important flour-producing state, showed an increase in the production of wheat flour during the decade 1909 to 1919 amounting to

5,767,632 barrels, or 25.4 per cent. Kansas ranked second in this respect, and showed an increase of 5,269,477 barrels, or 48.4 per cent, for the same period. The total output of the two states combined in 1919 represented a little more than one-third (33.7 per cent) of the total production of wheat flour for the United States. Tennessee ranked first in 1919 in the manufacture of corn meal and corn flour, Minnesota first in rye flour, and Pennsylvania first in buckwheat flour.

TABLE 14.—WHEAT FLOUR AND CORN MEAL AND CORN FLOUR PRODUCED BY MERCHANT MILLS, BY STATES: 1919, 1914, AND 1909.

STATE.	WHEAT FLOUR.						CORN MEAL AND CORN FLOUR.					
	1919		1914		1909		1919		1914		1909	
	Quantity (barrels).	Value.	Quantity (barrels).	Value.	Quantity (barrels).	Value.	Quantity (barrels).	Value.	Quantity (barrels).	Value.	Quantity (barrels).	Value.
United States...	132,465,604	\$1,430,444,111	116,403,770	\$543,839,508	105,756,645	\$550,116,254	10,682,952	\$82,059,560	16,327,993	\$54,963,301	21,552,737	\$66,941,095
Alabama.....	47,670	510,681	18,104	102,209	16,296	97,350	343,580	2,652,384	318,466	1,239,191	534,248	1,856,501
Arizona.....	150,254	1,655,632	79,414	493,648	79,526	530,244	8,096	75,084	2,414	9,756	1,902	9,121
Arkansas.....	354,222	3,874,738	291,964	1,510,427	239,003	1,302,917	237,272	1,901,421	468,338	1,544,048	514,502	1,666,670
California.....	3,353,303	37,296,512	1,733,007	10,341,920	1,805,248	10,375,701	113,250	1,064,460	93,165	410,157	50,969	222,399
Colorado.....	1,480,730	14,944,461	1,229,225	4,923,302	977,779	5,172,638	52,287	491,092	16,443	61,354	21,958	74,784
Connecticut.....	341	4,077	44	318	3,465	18,405	23,831	179,669	196,170	630,466	299,647	912,105
Delaware.....	110,494	1,283,733	157,852	797,625	174,224	1,011,511	53,379	401,089	67,790	229,967	77,399	239,772
Florida.....	(1)	(1)			4	40	42,567	308,754	26,082	114,663	24,832	73,654
Georgia.....	491,402	5,769,888	348,421	2,155,527	415,220	2,634,038	541,962	4,050,824	819,110	3,012,837	1,369,971	4,609,764
Idaho.....	1,104,634	11,088,516	571,965	2,261,403	386,022	1,819,581	1,785	18,674	5,048	18,809	180	1,016
Illinois.....	7,261,918	77,749,717	6,643,935	31,904,077	6,386,547	33,992,494	552,385	4,045,507	600,515	1,942,702	738,564	2,168,824
Indiana.....	4,305,436	47,088,134	4,526,879	21,183,688	4,794,847	25,315,671	512,179	4,451,950	984,239	3,030,308	855,409	2,483,265
Iowa.....	1,251,770	13,728,744	1,488,811	7,149,334	1,523,264	7,955,975	145,364	1,106,986	318,590	1,089,155	184,301	582,828
Kansas.....	16,157,221	171,564,543	12,777,552	56,514,360	10,887,744	52,589,013	241,247	1,860,184	388,750	1,371,077	576,941	1,767,903
Kentucky.....	2,659,791	30,317,827	2,728,464	13,880,767	2,832,288	15,921,025	826,775	6,457,901	774,322	2,645,405	984,217	3,071,856
Maine.....	33,607	389,272	8,820	54,598	13,976	87,956	72,566	590,035	659,195	2,150,281	818,507	2,373,095
Maryland.....	1,282,219	13,107,473	1,105,577	5,152,538	1,130,165	6,097,871	128,005	1,019,061	170,431	605,583	230,332	741,075
Massachusetts.....	7,647	91,863	14,272	73,477	9,887	50,616	116,422	832,556	720,254	2,140,998	1,165,288	3,491,181
Michigan.....	2,537,336	28,366,273	3,056,744	16,056,634	3,447,800	18,838,591	94,175	812,361	131,616	461,630	177,189	606,706
Minnesota.....	28,505,066	311,764,407	27,132,155	117,988,654	27,737,404	114,185,351	126,621	1,072,114	53,845	185,008	66,705	204,663
Missouri.....	7,132,417	75,273,509	5,409,391	25,633,116	5,672,269	30,054,028	822,994	6,235,585	763,678	2,641,988	1,020,738	3,129,694
Montana.....	1,271,861	13,794,193	8,791,918	3,919,318	375,440	1,860,851	(1)	318	1,500	425,413	1,222,670	
Nebraska.....	3,416,087	38,062,423	2,383,997	10,944,855	2,267,550	11,451,319	103,560	712,495	230,968	702,795	425,413	
Nevada.....	87,862	881,650	40,329	202,624	61,938	380,540	126,621	1,072,114	53,845	185,008	66,705	
New Hampshire.....	86,659	998,947	88,432	514,496	80,141	500,879	30,798	222,030	135,191	443,482	511,620	1,485,779
New Jersey.....	122,622	1,425,707	167,330	920,775	275,365	1,524,216	40,513	318,494	65,634	234,074	190,451	585,412
New Mexico.....	93,588	1,050,856	59,445	317,998	55,190	322,556	3,696	28,542	2,707	10,849	771	3,253
New York.....	9,053,389	99,985,220	8,522,011	40,798,737	6,666,628	35,659,891	466,303	2,622,848	1,470,365	4,382,960	2,090,537	5,967,943
North Carolina.....	1,315,322	15,423,355	951,305	5,231,833	759,072	4,763,956	624,431	4,980,429	543,491	2,043,292	586,872	2,294,852
North Dakota.....	2,225,155	24,997,484	2,165,078	9,864,400	1,825,920	205	1,794	445	2,120	1,626	5,124	
Ohio.....	5,790,258	63,330,697	5,707,781	27,852,222	5,723,536	30,508,109	371,042	2,716,482	524,941	1,606,817	865,250	2,528,843
Oklahoma.....	3,464,259	37,048,315	2,072,242	9,832,201	2,205,039	10,959,367	293,863	2,316,596	286,284	964,488	382,721	1,124,244
Oregon.....	3,341,756	34,477,758	1,791,334	7,749,619	1,340,281	6,015,845	557	4,634	2,867	14,050	559	2,236
Pennsylvania.....	3,312,713	36,821,700	3,975,031	17,795,116	3,749,842	20,150,978	271,435	2,051,136	760,299	2,509,596	767,462	2,369,701
Rhode Island.....	36	452	104	760	38	220	40,070	323,543	25,700	83,003	268,673	728,371
South Carolina.....	40,962	585,521	20,120	103,906	5,590	32,825	124,086	976,641	71,486	283,632	74,617	253,849
South Dakota.....	629,753	7,184,128	920,070	4,458,144	968,286	5,067,797	3,409	31,200	5,244	18,555	6,845	23,413
Tennessee.....	3,085,030	31,413,719	3,033,197	15,020,227	3,009,059	17,267,305	1,088,123	8,373,779	1,601,617	5,460,920	1,981,746	6,505,710
Texas.....	4,583,879	52,743,029	4,089,378	21,805,623	3,342,035	18,124,834	713,288	5,848,489	1,042,654	3,720,947	577,314	2,875,994
Utah.....	545,256	5,710,921	505,224	2,242,417	459,248	2,355,109	3,292	27,663	154	886	259	1,239
Vermont.....	11,530	134,337	3,133	17,467	108	1,014	211,215	1,540,559	458,617	1,453,190	853,051	2,511,964
Virginia.....	2,267,724	24,311,601	2,161,767	10,702,588	1,898,712	10,263,031	723,003	5,655,781	1,099,215	3,861,142	1,410,351	4,456,117
Washington.....	5,911,381	60,903,485	3,765,070	15,685,333	2,804,242	12,484,701	6,433	55,297	620	3,453	6,240	23,669
West Virginia.....	585,918	6,645,431	520,949	2,732,789	634,132	3,615,913	238,070	1,922,416	233,582	775,034	318,293	986,375
Wisconsin.....	2,809,320	30,604,789	3,056,954	13,817,821	3,499,965	17,909,059	209,961	1,173,791	168,531	610,958	85,532	287,740
Wyoming.....	103,748	1,154,906	106,189	530,528	99,537	505,294	1,072	11,523	1,646	7,529	1,033	4,094
All other States <sup>1</sup> ....	72,752	803,467	20	100	66,682	320,761	56,885	513,798	36,920	127,319	121,272	405,947

<sup>1</sup> Included in "All other states" to avoid disclosures of individual operations.

<sup>2</sup> Includes District of Columbia, Louisiana, and Mississippi.

## FLOUR-MILL AND GRISTMILL PRODUCTS.

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TABLE 15.—OTHER PRODUCTS OF MERCHANT MILLS, BY STATES: 1919.

STATE-	RYE FLOUR.		BUCKWHEAT FLOUR.		BARLEY MEAL.		HOMINY AND GRITS.		BRAN AND MIDDINGS.		FEED AND OFFAL.	
	Quantity (barrels).	Value.	Quantity (pounds).	Value.	Quantity (pounds).	Value.	Quantity (pounds).	Value.	Quantity (tons).	Value.	Quantity (tons).	Value.
United States....	2,527,752	\$21,235,808	90,137,407	\$5,244,539	91,800,114	\$3,217,464	288,525,502	\$9,247,224	4,760,326	\$211,435,518	4,566,855	\$262,733,518
Alabama.....							403,205	22,010	3,048	150,225	19,129	1,064,122
Arizona.....	(1)	(1)							5,732	239,777	8,851	421,596
Arkansas.....	3,541	38,024	(1)	(1)	10,599,133	769,973	667,951	33,903	13,244	618,581	34,513	2,243,220
California.....	3,365	47,406			(1)	(1)			129,859	6,602,503	253,206	17,268,767
Colorado.....									50,859	1,829,542	49,253	2,617,571
Connecticut.....	1,836	17,112	10,875	938					69	3,540	36,831	2,297,553
Delaware.....			176,194	9,310					5,069	288,592	1,166	73,011
Florida.....									(1)	1,264,950	3,750	230,754
Georgia.....	2,822	21,077							50,012	21,050	1,075,514	867,517
Idaho.....	(1)	(1)							39,907	1,504,845	14,051	791,844
Illinois.....	137,712	1,109,966	850,570	50,103	(1)	(1)	101,199,037	3,306,491	284,744	12,857,317	270,762	16,650,649
Indiana.....	30,698	336,020	757,616	50,829	(1)	(1)	93,956,630	3,222,770	165,615	7,995,593	179,555	10,602,954
Iowa.....	11,100	97,436	1,821,294	118,398	61,502	1,584	3,246,619	101,908	51,516	2,504,998	62,006	3,456,387
Kansas.....	17,450	153,524			(1)	(1)			(1)	596,119	24,972,803	123,724
Kentucky.....	809	6,738					18,397,250	500,635	96,433	4,837,504	58,390	3,454,981
Maine.....	(1)	(1)	1,003,730	71,331	(1)	(1)			1,514	67,701	72,620	4,313,434
Maryland.....	835	5,231	1,032,083	91,642			326,350	14,820	50,633	2,609,689	16,876	1,035,674
Massachusetts.....	5,792	49,055	43,650	2,536					(1)	(1)	59,600	3,805,531
Michigan.....	137,750	1,218,024	7,981,873	596,503	832,407	31,053	(1)	(1)	103,752	4,548,649	138,614	8,342,228
Minnesota.....	1,097,252	8,750,512	1,362,611	76,910	59,665,119	2,006,493			831,293	34,940,427	494,101	22,248,089
Missouri.....	6,403	52,926	9,672	740	2,107,162	59,185	8,073,600	236,176	275,382	12,901,429	212,320	13,495,953
Montana.....	138	1,494			(1)	(1)			40,202	1,689,705	7,427	439,920
Nebraska.....	15,201	144,587		98,015	7,068		(1)	(1)	119,191	5,098,577	176,364	8,803,487
Nevada.....									3,148	111,797	2,160	122,743
New Hampshire.....	(1)	(1)	(1)	(1)	(1)	(1)			3,562	178,140	33,165	1,985,169
New Jersey.....	71,837	628,050	928,241	54,661					7,823	406,241	47,456	3,186,708
New Mexico.....	(1)	(1)							4,225	213,443	382	23,589
New York.....	178,856	1,561,362	25,619,032	1,586,406	1,405,571	55,015			355,285	15,412,561	532,969	33,508,054
North Carolina.....	1,070	10,542	38,125	2,350	(1)	(1)	(1)	(1)	56,322	2,802,102	14,881	936,608
North Dakota.....	361	3,357	(1)	(1)	(1)	(1)			68,267	2,770,831	32,609	1,459,373
Ohio.....	22,044	180,374	3,853,140	220,015	69,500	5,316	(1)	(1)	229,515	10,568,845	192,610	12,063,914
Oklahoma.....	(1)	(1)							132,036	5,908,371	72,526	3,148,441
Oregon.....	(1)	(1)		4,500	245	1,132,930	29,961		98,122	3,800,078	66,239	3,946,156
Pennsylvania.....	163,922	1,539,631	27,331,935	1,576,265	1,501,775	20,534	(1)	(1)	139,505	7,239,364	299,597	18,002,515
Rhode Island.....	80	896							(1)	(1)	12,522	802,788
South Carolina.....	(1)	(1)					387,250	15,474	2,277	128,298	6,413	426,827
South Dakota.....	551	5,388	30,804	2,202					25,615	1,107,886	10,736	541,136
Tennessee.....	(1)	(1)	46,752	2,820	(1)	(1)	(1)	(1)	96,355	4,520,888	127,842	7,258,045
Texas.....	834	8,382			(1)	(1)	(1)	(1)	183,137	9,003,816	87,014	5,418,324
Utah.....	465	3,910					(1)	(1)	22,784	920,776	8,157	366,607
Vermont.....	(1)	(1)							544	26,042	69,464	4,429,697
Virginia.....	3,578	22,432	986,695	55,052	276,730	10,496	(1)	(1)	83,514	4,122,888	29,002	1,664,125
Washington.....	6,772	67,977	(1)	(1)					19,970	7,551,136	173,033	11,295,474
West Virginia.....	(1)	(1)							33,009	1,859,118	31,110	1,964,654
Wisconsin.....	601,350	5,092,950	2,735,765	169,891	(1)	(1)	20,310,186	1,021,825	118,872	5,058,171	301,160	14,802,574
Wyoming.....	313	3,518			721,370	31,188			3,9,1	159,611	1,476	81,686
All other states.....	949	8,701	1,167,306	71,940	5,393,000	196,660	31,262,564	720,570	2,927	146,961	47,167	2,915,778

<sup>1</sup> Included in "All other states" to avoid disclosures of individual operations.<sup>2</sup> Includes District of Columbia, Louisiana, and Mississippi.

**Classification of wheat flour mills, according to output.**—Table 16 shows the number of merchant mills producing wheat flour in the more important states for the censuses of 1919, 1914, and 1909, classified according to the number of barrels produced.

Of the 10,708 merchant mills reporting in 1919, there were 3,975 which produced no wheat flour. From 1914 to 1919 there was a decrease of 143 in the number of mills producing such flour. Increases in number are shown for only two of the five groups—those producing less than 1,000 barrels during the year and those with an output of 100,000 barrels or more. Mills which produced less than 5,000 barrels comprised 71 per cent of the wheat flour mills in 1919

and 69 per cent in 1914. There was an increase of 56 in the number of mills producing 100,000 barrels or more during the five-year period.

Minnesota, the leading state in the production of flour, shows a decrease in the number of wheat flour mills from 1914 to 1919, and shows increases only for two of the five classes of mills—those producing 1,000 to 5,000 barrels and those whose output was 100,000 barrels or more. Decreases in the total number of mills producing wheat flour took place also in New York, Illinois, and Missouri, which ranked third, fourth, and fifth, respectively, in the production of such flour in 1919, as shown by Table 16, but the number increased in Kansas, which ranked second.

## MANUFACTURES.

TABLE 16.—MERCHANT MILLS MANUFACTURING WHEAT FLOUR, GROUPED ACCORDING TO NUMBER OF BARRELS PRODUCED, BY STATES: 1919, 1914, AND 1909.

STATE.	Census year.	Total number of mills.	Less than 1,000 barrels.	1,000 but less than 5,000 barrels.	5,000 but less than 20,000 barrels.	20,000 but less than 100,000 barrels.	100,000 barrels or more.	STATE.	Census year.	Total number of mills.	Less than 1,000 barrels.	1,000 but less than 5,000 barrels.	5,000 but less than 20,000 barrels.	20,000 but less than 100,000 barrels.	100,000 barrels or more.
United States.....	1919	6,733	2,041	2,739	1,185	494	274	New Jersey.....	1919	58	31	19	8	.....	.....
	1914	6,876	1,821	2,920	1,377	540	218		1914	66	30	25	10	1	.....
	1909	7,342	1,721	3,145	1,733	550	103		1909	100	42	40	17	1	.....
Arkansas.....	1919	96	34	53	7	1	1	New York.....	1919	217	88	59	41	17	12
	1914	58	17	39	9	2	.....		1914	244	101	69	42	19	13
	1909	51	13	30	6	2	.....		1909	270	105	86	49	19	11
California.....	1919	59	10	21	12	10	6	North Carolina.....	1919	290	97	150	38	1	4
	1914	59	10	23	12	9	5		1914	239	48	137	49	5	.....
	1909	66	12	22	19	9	4		1909	208	51	120	34	3	.....
Colorado.....	1919	60	13	15	10	18	4	North Dakota.....	1919	77	17	29	13	11	7
	1914	48	6	13	12	13	4		1914	56	4	17	15	13	7
	1909	48	9	13	14	10	2		1909	64	6	10	26	15	7
Georgia.....	1919	32	14	9	3	5	1	Ohio.....	1919	492	81	243	131	27	10
	1914	46	29	10	3	3	1		1914	549	88	282	145	23	11
	1909	47	20	18	5	3	1		1909	593	66	296	188	33	10
Idaho.....	1919	64	12	23	12	15	2	Oklahoma.....	1919	103	27	28	18	17	13
	1914	51	9	18	15	9	.....		1914	79	23	15	16	18	7
	1909	48	4	19	21	4	.....		1909	92	15	16	34	22	5
Illinois.....	1919	212	49	57	53	38	15	Oregon.....	1919	97	24	25	26	13	9
	1914	253	64	83	52	42	12		1914	84	21	30	21	9	3
	1909	309	87	87	76	47	12		1909	104	9	46	38	8	3
Indiana.....	1919	352	67	179	81	16	9	Pennsylvania.....	1919	767	313	316	111	23	4
	1914	417	79	197	105	29	7		1914	824	290	392	114	24	4
	1909	463	52	227	148	28	8		1909	917	332	427	141	14	3
Iowa.....	1919	133	55	46	21	10	1	South Dakota.....	1919	61	10	26	17	1	1
	1914	150	58	52	25	11	4		1914	65	2	28	24	9	2
	1909	195	73	64	44	11	3		1909	86	10	31	33	11	1
Kansas.....	1919	213	23	41	38	50	52	Tennessee.....	1919	406	177	166	46	11	6
	1914	199	27	23	41	63	45		1914	409	119	205	63	17	5
	1909	255	46	32	61	81	35		1909	353	79	181	78	10	5
Kentucky.....	1919	344	110	166	54	10	4	Texas.....	1919	130	20	51	25	20	14
	1914	350	64	180	94	10	2		1914	90	10	21	16	32	11
	1909	353	50	188	99	14	2		1909	102	18	20	33	22	9
Maryland.....	1919	201	79	86	24	10	2	Utah.....	1919	75	8	40	23	4	.....
	1914	203	76	87	32	6	2		1914	69	8	28	27	6	.....
	1909	235	79	114	37	3	2		1909	50	3	24	28	4	.....
Michigan.....	1919	262	84	112	45	16	5	Virginia.....	1919	413	147	190	63	11	2
	1914	341	103	142	70	21	5		1914	428	129	224	59	12	4
	1909	389	96	178	87	21	7		1909	348	103	181	47	13	4
Minnesota.....	1919	215	25	82	50	18	40	Washington.....	1919	73	13	9	15	23	13
	1914	240	29	80	67	30	34		1914	70	13	18	14	22	8
	1909	270	22	96	87	33	32		1909	65	5	14	16	24	6
Missouri.....	1919	469	162	186	66	34	21	West Virginia.....	1919	168	78	70	15	5	.....
	1914	477	122	219	84	39	13		1914	163	71	73	14	5	.....
	1909	499	111	237	105	32	14		1909	157	56	70	25	6	.....
Montana.....	1919	56	15	18	8	12	3	Wisconsin.....	1919	144	39	64	29	7	5
	1914	29	3	9	9	6	2		1914	171	75	60	24	8	4
	1909	12	4	5	4	4	.....		1909	218	69	95	34	14	6
Nebraska.....	1919	190	28	84	53	17	8	All other states.....	1919	204	91	76	29	8	.....
	1914	190	22	74	73	18	3		1914	159	71	61	21	6	.....
	1909	203	14	86	79	23	1		1909	163	64	74	19	6	.....

Output of merchant mills producing 1,000 barrels or more of wheat flour in 1919.—In order to exclude the small merchant mills which grind wheat and other grain chiefly for local trade, Table 17 shows, by states, the quantity of wheat used, the number of barrels of flour manufactured, and its value for those mills producing 1,000 barrels of wheat flour or more in 1919 and 1914.

There was a decrease of 363 in the number of mills producing 1,000 barrels or more of wheat flour between 1914 and 1919, but the output of this class of mills increased 15,909,023 barrels, or 13.8 per cent. Minnesota reported 21.7 per cent of the total number of barrels produced by the mills of this class in 1919 and 23.4 per cent in 1914.

# FLOUR-MILL AND GRISTMILL PRODUCTS.

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TABLE 17.—MERCHANT MILLS PRODUCING 1,000 BARRELS OR MORE OF WHEAT FLOUR, BY STATES: 1919 AND 1914.

STATE.	Census year.	Number of establishments.	Wheat used (bushels).	WHEAT FLOUR PRODUCED.		STATE.	Census year.	Number of establishments.	Wheat used (bushels).	WHEAT FLOUR PRODUCED.	
				Quantity (barrels).	Value.					Quantity (barrels).	Value.
United States.....	1919	4,692	607,066,887	131,595,773	\$1,426,503,672	Kentucky.....	1919	234	12,166,510	2,034,387	\$29,678,795
	1914	5,055	512,620,843	115,686,750	540,107,717		1914	286	12,936,103	2,696,843	13,708,173
Minnesota.....	1919	190	130,809,031	28,463,454	311,627,174	Michigan.....	1919	178	11,819,206	2,495,449	27,926,052
	1914	211	124,267,178	27,117,914	117,908,516		1914	238	14,387,254	3,010,667	15,809,508
Kansas.....	1919	190	73,907,376	16,150,052	171,482,381	North Dakota.....	1919	60	10,041,185	2,215,675	24,881,249
	1914	172	59,019,438	12,772,478	56,480,465		1914	52	10,390,983	2,163,938	9,855,100
New York.....	1919	129	43,203,302	9,026,497	99,673,171	Virginia.....	1919	266	10,121,257	2,137,906	23,514,125
	1914	143	38,039,814	8,492,489	40,641,848		1914	299	9,923,462	2,099,328	10,346,819
Illinois.....	1919	163	33,334,028	7,244,663	77,542,392	Colorado.....	1919	47	6,920,735	1,476,280	14,893,615
	1914	189	30,910,199	6,027,369	31,815,570		1914	42	5,723,302	1,226,731	4,910,323
Missouri.....	1919	307	32,449,767	7,075,525	74,624,403	North Carolina.....	1919	193	5,996,439	1,268,523	14,884,435
	1914	355	25,036,518	5,354,186	25,381,818		1914	191	4,605,653	931,982	5,122,225
Washington.....	1919	60	26,811,418	5,904,805	60,840,166	Montana.....	1919	41	5,686,103	1,263,457	13,684,483
	1914	57	17,546,245	3,760,873	15,661,494		1914	26	4,134,087	870,065	3,908,795
Ohio.....	1919	411	26,016,065	5,738,298	62,821,141	Maryland.....	1919	122	5,532,610	1,247,409	12,708,501
	1914	461	27,581,757	5,667,605	27,640,879		1914	127	5,131,046	1,073,760	4,991,525
Texas.....	1919	110	21,288,674	4,573,889	52,624,883	Iowa.....	1919	78	5,862,581	1,238,257	13,573,743
	1914	80	18,957,182	4,085,185	21,783,232		1914	92	7,039,082	1,473,196	7,066,637
Indiana.....	1919	285	19,897,063	4,276,959	46,765,517	Idaho.....	1919	52	5,085,233	1,100,140	11,039,369
	1914	338	21,036,091	4,494,402	21,016,635		1914	42	2,802,009	568,711	2,247,152
Oklahoma.....	1919	76	15,735,526	3,453,932	36,933,186	South Dakota.....	1919	51	2,982,472	625,355	7,126,827
	1914	56	9,572,492	2,068,536	9,814,280		1914	63	4,485,332	919,443	4,455,574
Nebraska.....	1919	162	15,890,652	3,401,637	37,923,944	West Virginia.....	1919	90	2,730,370	546,762	6,188,739
	1914	168	11,308,083	2,375,810	10,906,829		1914	92	2,357,728	485,699	2,542,018
California.....	1919	49	15,682,750	3,370,795	37,256,765	Utah.....	1919	67	2,662,506	541,156	5,665,917
	1914	49	9,530,954	1,778,345	10,314,493		1914	61	2,502,200	500,722	2,217,469
Oregon.....	1919	73	14,045,031	3,334,000	34,392,635	Georgia.....	1919	18	2,181,977	486,164	5,707,132
	1914	63	8,507,961	1,783,023	7,706,536		1914	17	1,576,623	340,075	2,104,720
Pennsylvania.....	1919	454	15,262,871	3,184,000	35,401,057	Arkansas.....	1919	62	1,558,666	337,559	3,686,061
	1914	531	18,739,381	3,657,993	19,185,814		1914	41	1,360,815	283,878	1,488,050
Tennessee.....	1919	229	12,727,277	3,005,468	30,472,192	New Jersey.....	1919	27	512,324	111,622	1,307,284
	1914	290	14,303,610	3,037,904	15,321,426		1914	36	789,174	158,504	873,821
Wisconsin.....	1919	105	13,273,354	2,796,476	30,453,081	All other states.....	1919	113	3,931,598	823,913	9,200,167
	1914	96	13,675,817	3,030,803	13,681,829		1914	88	3,212,335	578,233	3,206,114

Output of flour mills producing 100,000 barrels or more of wheat flour in 1919.—Table 18 shows, by states, the number of mills producing 100,000 barrels or more of wheat flour, the quantity of wheat used, and the quantity and value of the flour manufactured.

The 274 mills reporting 100,000 barrels or more of wheat flour in 1919 used 67.9 per cent of the total quantity of wheat reported for all establishments in the industry, produced 68.6 per cent of the total num-

ber of barrels of wheat flour, while the value of the output represented 68.4 per cent of the total value of such flour for the United States.

Kansas led in the number of mills of this class, with 52 with an average production of 240,852 barrels. The three states reporting the greatest average output per establishment were Minnesota, with 40 mills, with an average of 672,812 barrels; New York, 12 mills, with an average of 643,856 barrels; and California, 6 mills, with an average of 460,542 barrels.

TABLE 18.—MILLS PRODUCING 100,000 BARRELS OR MORE OF WHEAT FLOUR, BY STATES: 1919.

STATE.	Number of establishments.	Average production per establishment (barrels).	Wheat used (bushels).	Flour produced (barrels).	Value.	STATE.	Number of establishments.	Average production per establishment (barrels).	Wheat used (bushels).	Flour produced (barrels).	Value.
United States.....	274	331,495	415,740,379	90,829,763	\$94,602,277	New York.....	12	643,856	36,907,945	7,726,272	\$4,973,610
California.....	6	460,542	12,408,207	2,763,251	30,060,643	North Carolina.....	4	139,026	2,573,533	556,102	6,658,587
Colorado.....	4	147,882	2,609,246	591,526	5,028,993	North Dakota.....	7	238,487	7,505,382	1,669,406	18,760,316
Illinois.....	15	307,882	21,064,061	4,168,227	48,828,532	Ohio.....	10	266,588	12,294,501	2,665,882	29,113,132
Indiana.....	9	252,480	10,433,883	2,272,318	24,732,677	Oklahoma.....	13	102,666	11,326,074	2,504,653	26,601,976
Kansas.....	52	240,852	57,094,101	12,524,284	132,647,538	Oregon.....	9	257,311	11,375,055	2,585,706	26,836,198
Kentucky.....	4	358,741	6,307,920	1,434,965	15,795,499	Pennsylvania.....	4	191,975	3,567,385	767,001	9,575,987
Michigan.....	5	232,150	5,328,610	1,160,751	13,148,497	Tennessee.....	6	240,211	6,784,612	1,441,264	16,323,957
Minnesota.....	40	672,812	123,234,904	26,912,468	293,524,338	Texas.....	14	224,078	14,432,202	3,137,095	36,067,250
Missouri.....	21	212,527	20,605,036	4,463,073	47,816,606	Washington.....	13	343,030	20,062,186	4,459,387	46,264,550
Montana.....	3	185,635	2,456,247	556,905	5,922,147	Wisconsin.....	5	397,308	8,794,599	1,986,538	20,868,239
Nebraska.....	8	235,245	8,860,316	1,905,962	21,476,905	All other states.....	10	212,574	9,624,269	2,125,737	22,673,070

## MANUFACTURES.

## GENERAL TABLES.

The principal data secured by the census inquiry concerning flour mills and gristmills, other than those relating to quantity and value of materials and products, are presented, by states, in Tables 19, 20, and 21.

**Comparative summary, by states.**—Table 19 relates to merchant mills, and shows, for 1919, 1914, and 1909, the number of establishments, average number of

wage earners, primary horsepower, wages, cost of materials, and value of products.

**Detailed statement, by states.**—Table 20 gives more detailed statistics for merchant mills for 1919.

**Detailed statement for custom mills.**—Table 21 gives statistics for 1919 for the mills engaged exclusively in custom grinding.

TABLE 19.—MERCHANT MILLS—COMPARATIVE SUMMARY, BY STATES: 1919, 1914, AND 1909.

STATE.	Cen-sus-year.	Num-ber of es-tab-lish-ments.	Wage earners (aver-age num-ber).	Primary horse-power.	Wages.	Cost of ma-terials.	Value of prod-ucts.	STATE.	Cen-sus-year.	Num-ber of es-tab-lish-ments.	Wage earners (aver-age num-ber).	Primary horse-power.	Wages.	Cost of ma-terials.	Value of prod-ucts.
United States.....	1919	10,708	45,481	876,405	\$50,888	\$1,799,181	\$2,052,434	Maine.....	1919	118	144	4,744	\$147	\$4,709	\$5,443
	1914	10,785	39,718	822,384	24,593	752,270	877,680		1914	148	217	6,025	128	3,959	4,426
	1909	11,091	39,453	853,584	21,464	707,576	883,584		1909	173	225	7,720	101	4,027	4,507
Alabama.....	1919	143	152	4,994	133	3,848	4,565	Maryland.....	1919	247	478	11,351	449	16,357	19,004
	1914	73	125	2,914	43	1,918	2,179		1914	247	473	11,398	241	6,919	8,164
	1909	72	103	3,569	57	2,405	2,779		1909	295	506	13,807	227	8,003	9,268
Arizona.....	1919	12	72	928	98	1,967	2,392	Massachusetts.....	1919	75	123	4,013	130	4,250	4,878
	1914	8	38	536	34	850	1,065		1914	105	176	4,900	101	3,424	3,811
	1909	10	54	784	42	1,129	1,317		1909	120	229	5,642	126	4,131	4,632
Arkansas.....	1919	166	267	7,005	243	7,073	8,646	Michigan.....	1919	345	1,128	29,928	1,257	38,185	44,145
	1914	102	282	5,880	123	5,172	5,802		1914	427	1,370	35,321	859	23,299	27,381
	1909	113	312	5,946	122	4,859	5,615		1909	520	1,530	38,991	806	29,359	34,861
California.....	1919	134	1,770	16,866	2,229	56,883	65,448	Minnesota.....	1919	248	6,049	114,764	7,781	337,873	381,249
	1914	132	1,067	13,374	812	19,504	24,079		1914	286	4,564	100,638	3,407	127,315	148,244
	1909	125	948	11,545	732	21,892	25,188		1909	322	4,345	93,849	2,782	124,217	139,136
Colorado.....	1919	120	490	9,074	580	17,507	19,954	Mississippi.....	1919	54	61	1,634	49	1,897	2,002
	1914	83	388	6,746	316	6,438	7,536		1914	17	48	783	14	344	410
	1909	77	282	6,810	220	6,672	7,868		1909	13	18	600	5	131	163
Connecticut.....	1919	64	80	2,351	84	2,083	2,507	Missouri.....	1919	690	3,015	47,546	8,154	98,185	113,297
	1914	85	113	2,971	59	1,631	1,881		1914	641	2,096	39,003	1,122	33,262	38,666
	1909	98	145	3,616	72	1,731	2,024		1909	680	2,198	43,175	1,040	38,826	44,508
Delaware.....	1919	56	95	2,736	95	1,665	2,056	Montana.....	1919	69	360	6,572	\$474	\$14,092	\$16,386
	1914	60	127	3,287	59	1,203	1,483		1914	33	256	4,078	209	3,902	4,890
	1909	65	139	3,349	57	1,500	1,752		1909	12	105	2,313	105	1,693	2,175
District of Columbia.....	1919	3	23	295	26	806	901	Nebraska.....	1919	218	1,063	21,854	1,240	47,559	53,521
	1914	3	5	190	3	72	78		1914	211	682	17,830	514	12,983	15,022
	1909	7	38	556	16	432	500		1909	249	889	19,907	619	15,217	17,836
Florida.....	1919	27	52	1,098	83	470	568	Nevada.....	1919	10	25	482	27	991	1,116
	1914	13	22	382	7	134	166		1914	7	23	465	21	387	408
	1909	6	11	141	5	130	164		1909	8	24	395	24	496	508
Georgia.....	1919	161	371	9,927	314	10,549	11,991	New Hampshire.....	1919	48	83	2,942	96	2,926	3,391
	1914	128	367	8,672	144	5,254	6,084		1914	70	144	4,597	89	2,422	2,734
	1909	103	380	9,052	144	6,728	8,000		1909	105	116	5,502	62	2,809	3,187
Idaho.....	1919	78	304	5,603	381	11,828	13,501	New Jersey.....	1919	150	232	6,631	220	5,036	6,040
	1914	71	188	3,914	155	2,727	3,396		1914	196	341	8,870	188	3,590	4,320
	1909	57	125	3,595	91	2,025	2,480		1909	238	453	10,763	225	4,561	5,538
Illinois.....	1919	322	2,740	37,118	2,926	103,165	116,563	New Mexico.....	1919	30	66	1,631	65	1,092	1,324
	1914	406	2,398	35,793	1,458	42,841	49,493		1914	17	29	761	16	337	425
	1909	461	2,464	38,472	1,271	45,590	51,111		1909	16	28	582	17	354	462
Indiana.....	1919	450	2,280	39,341	2,272	65,740	75,112	New York.....	1919	716	3,012	67,326	3,391	135,634	155,272
	1914	512	2,281	41,350	1,280	32,241	37,488		1914	891	3,070	72,269	1,997	67,423	77,409
	1909	563	2,298	38,502	1,216	35,002	40,541		1909	983	2,990	78,098	1,669	60,470	69,802
Iowa.....	1919	180	500	13,720	578	18,613	21,325	North Carolina.....	1919	374	629	17,148	563	21,046	24,258
	1914	227	790	16,388	486	11,758	14,337		1914	293	588	14,227	231	7,644	8,964
	1909	277	647	18,832	382	10,934	12,871		1909	240	496	11,578	180	7,287	8,501
Kansas.....	1919	385	3,493	59,829	4,146	182,334	206,881	North Dakota.....	1919	87	568	9,664	679	26,223	29,282
	1914	360	2,357	46,015	1,680	64,242	72,895		1914	59	424	7,810	330	10,072	12,030
	1909	501	2,360	40,218	1,448	60,439	68,476		1909	84	435	8,907	283	10,055	11,655
Kentucky.....	1919	533	1,584	28,852	1,423	39,581	45,774	Ohio.....	1919	577	2,122	47,830	2,439	77,102	89,397
	1914	442	1,447	25,151	658	17,419	21,229		1914	649	2,363	58,524	1,506	38,957	45,171
	1909	440	1,401	24,773	591	18,664	22,365		1909	673	2,585	52,250	1,415	41,353	48,093
Louisiana.....	1919	17	48	600	43	1,188	1,384	Oklahoma.....	1919	227	658	16,573	1,021	44,180	49,844
	1914	7	31	313	14	624	687		1914	253	700	14,050	420	14,367	16,680
	1909	11	82	895	33	840	943		1909	293	812	16,400	473	16,493	10,144

## FLOUR-MILL AND GRISTMILL PRODUCTS.

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TABLE 19.—MERCHANT MILLS—COMPARATIVE SUMMARY, BY STATES: 1919, 1914, AND 1909—Continued.

STATE.	Cen-sus year.	Num-ber of estab-lish-ments.	Wage earners (aver-age num-ber).	Primary horse-power.	Wages.	Cost of mate-rials.	Value of prod-ucts.	STATE	Cen-sus year.	Num-ber of estab-lish-ments.	Wage earners (aver-age num-ber).	Primary horse-power.	Wages.	Cost of mate-rials.	Value of prod-ucts.		
Expressed in thousands.								Expressed in thousands.								Expressed in thousands.	
Oregon.....	1919	116	822	13,314	\$1,166	\$37,802	\$42,550	Utah.....	1919	77	249	5,030	\$269	\$6,552	\$7,569		
	1914	95	450	8,565	330	9,827	11,193		1914	70	198	3,519	144	2,637	3,156		
	1909	114	394	11,541	278	7,667	8,891		1909	60	184	3,312	131	2,511	3,131		
Pennsylvania.....	1919	1,198	2,198	55,928	2,259	59,985	69,447	Vermont.....	1919	108	169	8,051	158	5,332	6,144		
	1914	1,265	2,595	61,790	1,424	37,007	43,626		1914	125	179	7,355	105	3,659	4,143		
	1909	1,450	2,432	69,212	1,188	38,170	44,783		1909	133	156	8,714	76	3,528	4,133		
Rhode Island.....	1919	25	20	1,253	34	378	1,133	Virginia.....	1919	537	937	22,632	826	30,928	36,154		
	1914	20	74	1,062	29	690	798		1914	533	1,082	23,086	463	15,390	18,084		
	1909	18	39	1,046	22	790	886		1909	458	1,014	21,454	369	15,164	17,598		
South Carolina.....	1919	30	70	1,352	44	1,805	2,147	Washington.....	1919	119	1,536	20,785	2,144	73,155	81,141		
	1914	37	30	1,046	12	346	421		1914	100	928	13,401	744	20,272	23,665		
	1909	10	23	406	7	308	351		1909	96	644	11,773	464	15,474	17,853		
South Dakota.....	1919	80	221	5,369	283	7,891	8,873	West Virginia.....	1919	203	371	8,704	378	10,530	13,077		
	1914	72	255	6,412	184	4,722	5,557		1914	229	381	9,996	218	5,928	7,053		
	1909	95	285	7,364	187	5,386	6,208		1909	207	452	9,950	210	6,601	7,666		
Tennessee.....	1919	661	1,472	27,533	1,281	45,176	51,913	Wisconsin.....	1919	221	1,348	30,245	1,561	51,737	58,304		
	1914	512	1,497	28,246	642	22,072	26,414		1914	262	1,116	26,350	737	24,980	28,697		
	1909	454	1,577	27,176	559	25,286	29,070		1909	322	1,184	31,903	695	27,038	31,667		
Texas.....	1919	222	1,567	23,854	1,681	63,400	73,064	Wyoming.....	1919	28	37	1,381	49	1,183	1,411		
	1914	191	1,300	19,968	798	29,573	35,110		1914	16	33	1,163	27	555	722		
	1909	238	1,216	20,765	609	28,657	32,485		1909	13	29	885	21	583	746		

## MANUFACTURES.

TABLE 20.—MERCHANT MILLS—DETAILED STATISTICS FOR THE INDUSTRY, BY STATES: 1919.

STATE.	PERSONS ENGAGED IN THE INDUSTRY.										WAGE EARNERS DEC. 15, OR NEAREST REPRESENTATIVE DAY.						EXPENSES.		
	Number of establish- ments.	Propri- etors and firm mem- bers.	Sala- ried offi- cers, super- in- tendents, and man- agers.		Clerks, etc.		Wage earners.				16 and over.		Under 16.		Capital.	Salaries and wage			
			Total.	Male.	Fe- male.	Ave- rage num- ber.	Male.	Fe- male.	Number, 15th day of—	Maximum month.	Minimum month.	Male.	Fe- male.	Male.	Fe- male.	Officials.	Clerks, etc.		
United States	10,708	75,769	11,937	6,127	8,834	3,390	45,481	De	49,393	Mh	42,179	49,932	48,688	1,170	72	2	\$80,624,507	\$17,203,661	\$14,809,369
Alabama	143	379	177	24	21	5	152	De	174	My	134	176	176	-----	-----	-----	1,385,731	58,761	37,995
Arizona	12	113	3	22	11	5	72	Jy	87	Ja	64	73	73	-----	-----	-----	3,209,015	62,020	22,913
Arkansas	106	596	223	59	39	17	267	Se	287	Je	247	297	294	1	2	-----	3,683,631	109,633	78,944
California	134	2,579	65	144	439	152	1,779	No	2,005	Mh	1,615	2,052	1,858	192	2	-----	27,077,832	355,585	802,386
Colorado	120	736	39	104	88	15	490	De	556	Je	400	554	554	-----	-----	-----	8,850,998	287,339	150,349
Connecticut	64	170	66	14	6	4	80	De	90	Mh	73	93	93	-----	-----	-----	1,932,131	19,058	8,596
Delaware	56	176	71	2	6	2	93	Mh	97	Je	93	98	98	-----	-----	-----	988,397	5,800	9,552
District of Columbia	3	36	1	6	6	-----	23	All <sup>a</sup>	28	Ja	18	28	28	-----	-----	-----	281,530	16,810	5,200
Florida	27	91	27	7	4	1	52	Jy	57	Ap	48	55	55	-----	-----	-----	281,712	10,324	4,940
Georgia	161	679	191	60	45	12	371	No	400	Je	341	418	415	1	2	-----	4,085,258	184,931	93,656
Idaho	78	468	52	50	42	20	304	De	344	Jy	260	346	343	3	-----	-----	8,797,938	132,212	73,809
Illinois	322	4,007	331	302	418	156	2,740	Se	2,937	Mh	2,567	2,983	2,938	45	-----	-----	46,288,650	1,337,318	742,806
Indiana	450	3,471	489	280	265	157	2,280	Se	2,473	Fe	2,084	2,394	2,323	71	-----	-----	29,939,740	750,807	514,561
Iowa	189	928	219	82	79	39	509	De	576	Jy	475	588	578	7	3	-----	9,116,142	199,666	141,705
Kansas	385	5,288	341	507	629	258	3,493	Se	4,053	De	3,048	3,994	71	1	-----	73,137,213	1,872,000	1,227,501	
Kentucky	533	2,830	741	168	246	91	1,584	All <sup>a</sup>	1,730	Mh	1,423	1,658	1,603	53	2	-----	22,789,346	448,455	487,429
Louisiana	17	74	11	9	6	-----	48	No <sup>a</sup>	63	Je	35	61	59	2	-----	-----	597,764	13,435	11,240
Maine	118	299	114	25	6	10	144	De	156	Au	134	169	154	15	-----	-----	2,706,040	51,470	10,545
Maryland	247	931	286	58	79	30	478	De	524	Ja	438	523	514	9	-----	-----	7,503,887	151,610	102,093
Massachusetts	75	238	79	18	7	11	123	De	138	Mh	116	143	135	8	-----	-----	3,135,522	32,981	15,652
Michigan	345	1,947	400	168	145	108	1,128	Ja	1,266	Je	1,022	1,224	1,125	99	-----	-----	18,096,143	399,982	266,556
Minnesota	248	10,636	180	612	2,988	857	6,049	De	504	Mh	5,607	6,561	6,380	7	-----	-----	11,366,446	2,021,226	3,870,348
Mississippi	54	127	53	7	6	-----	61	Oc <sup>a</sup>	65	Ap	58	62	62	-----	-----	-----	606,420	14,045	7,088
Missouri	690	4,693	754	420	336	168	3,015	Oc	3,583	Je	2,722	3,190	3,079	109	2	-----	46,750,101	1,149,833	647,838
Montana	69	566	33	77	67	29	360	Mh	405	De	244	384	376	8	-----	-----	9,727,396	150,609	141,556
Nebraska	218	1,895	259	232	245	96	1,063	De	1,195	Je	981	1,176	1,141	35	-----	-----	19,122,295	612,372	470,524
Nevada	10	49	4	13	4	3	25	Oc	31	Je	17	29	28	1	-----	-----	766,235	22,994	5,925
New Hampshire	48	160	60	6	9	2	83	De	96	Je	75	97	97	-----	-----	-----	1,419,428	29,400	19,206
New Jersey	150	471	171	32	19	17	232	My	239	Jy	224	240	237	2	1	-----	3,024,290	52,609	32,508
New Mexico	30	119	27	18	5	3	66	Se	82	Fe <sup>a</sup>	52	82	82	-----	-----	-----	1,023,473	16,156	7,177
New York	716	4,881	824	325	490	230	3,012	Oc	3,322	Mh	2,625	3,376	3,200	85	1	-----	54,569,928	1,214,734	844,814
North Carolina	374	1,255	451	103	56	16	629	No	671	Je	594	671	664	2	5	-----	7,408,004	175,657	97,903
North Dakota	87	748	53	73	42	12	568	Oc	619	Jy	538	582	577	3	2	-----	7,745,781	152,756	62,819
Ohio	577	3,563	717	313	228	183	2,122	Se	2,281	Fe	2,335	2,318	13	2	2	-----	32,284,802	926,752	452,835
Oklahoma	227	1,630	224	163	218	67	958	Au	1,098	My	763	1,095	1,062	17	16	-----	18,746,451	423,717	374,804
Oregon	116	1,232	99	142	113	56	822	De	959	Jy	652	954	929	25	-----	-----	23,099,592	387,018	214,125
Pennsylvania	1,138	4,113	1,402	206	195	112	2,198	De	2,349	Fe	2,133	2,358	2,325	25	8	-----	32,373,587	469,996	429,998
Rhode Island	25	66	21	6	2	8	29	Ja	31	Jy	26	30	30	-----	-----	-----	830,185	9,850	8,349
South Carolina	30	120	26	21	-----	3	70	De	84	Fe	56	84	83	1	-----	-----	690,986	33,298	12,413
South Dakota	80	346	39	50	17	19	221	Ja	250	Je	195	229	228	1	-----	-----	3,740,218	110,002	43,055
Tennessee	661	2,820	889	216	178	65	1,472	Oc	1,657	Je	1,297	1,575	1,566	6	3	-----	19,477,871	442,705	324,988
Texas	222	2,403	229	237	314	58	1,567	De	1,781	Ja	1,394	1,739	1,734	3	2	-----	40,453,216	697,532	557,385
Utah	77	426	86	60	19	12	249	No	284	Ja	228	268	256	11	1	-----	3,328,942	84,930	35,530
Vermont	108	341	132	18	11	11	169	De	182	Jy	169	187	183	4	-----	-----	3,035,058	29,672	17,122
Virginia	537	1,937	695	161	89	55	937	Se	994	Ap	891	970	960	2	2	-----	23,523,479	305,359	176,381
Washington	119	2,153	67	175	272	103	1,536	No	1,829	Jy	1,332	1,735	1,680	53	2	-----	39,058,570	517,564	552,184
West Virginia	203	754	251	53	63	16	371	De <sup>a</sup>	391	My	355	394	385	6	3	-----	5,520,372	155,170	98,680
Wisconsin	221	2,091	239	146	263	95	1,348	Oc	1,553	Fe	1,187	1,471	1,461	8	2	-----	16,945,838	476,682	485,741
Wyoming	28	88	26	15	7	3	37	Ja	52	Jy	23	59	59	-----	-----	-----	1,114,023	20,796	8,487

<sup>a</sup> Includes water wheels and turbines (irrespective of ownership of water supply), and water motors (operated by water from city mains).<sup>b</sup> Chiefly electric motors operated by rented (or purchased) current; other power included (chiefly shaft-belt or transmitted power from neighboring power plants).

# FLOUR-MILL AND GRISTMILL PRODUCTS.

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TABLE 20.—MERCHANT MILLS—DETAILED STATISTICS FOR THE INDUSTRY, BY STATES: 1919—Continued.

STATE.	EXPENSES—continued.							Value added by manufacturer.	POWER.					Electric horse-power generated in establishments reporting.	
	Salaries and wages—Con.		Rent and taxes.		For materials.				Primary horsepower.						
	Wage earners.	For contract work.	Rent of factory.	Taxes, Federal, state, county, and local.	Principal materials.	Fuel and rent of power.			Total.	Steam engines (not turbines).	Steam turbines.	Internal-combustion engines.	Water power. <sup>1</sup>	Rented. <sup>2</sup>	
United States.	Dollars. 50,888,383	Dollars. 942,256	Dollars. 1,663,072	Dollars. 17,599,395	Dollars. 1,783,901,111	Dollars. 15,279,876	Dollars. 2,052,434,385	Dollars. 253,233,398	876,405	302,826	26,763	90,291	186,087	264,138	46,113
Alabama.....	132,981	1,312	6,775	11,402	3,793,875	54,065	4,565,179	717,239	4,994	1,305	.....	924	591	2,171	33
Arizona.....	98,435	313	20,408	1,937,200	29,719	2,392,089	425,170	928	235	.....	80	160	453	.....	.....
Arkansas.....	243,463	2,022	10,748	90,368	6,950,655	122,326	5,485,569	1,572,588	7,005	2,638	1,317	669	2,381	45	.....
California.....	2,229,241	10,088	27,912	432,702	56,476,650	406,056	65,448,352	8,565,046	16,866	3,299	10	544	420	12,593	618
Colorado.....	569,327	421	4,949	405,112	17,429,570	167,059	19,954,119	2,357,490	9,074	4,659	.....	637	806	2,972	72
Connecticut.....	84,520	200	6,302	57,280	2,067,213	15,872	2,507,114	424,029	2,351	566	.....	178	677	930	.....
Delaware.....	95,341	.....	6,504	1,643,870	21,522	2,055,735	390,343	2,736	295	.....	584	1,727	130	.....	.....
Dist. of Columbia.....	26,082	.....	900	5,167	802,799	3,230	900,531	94,505	295	100	.....	150	45	.....	.....
Florida.....	33,087	.....	880	3,503	461,421	9,669	568,023	97,593	1,093	550	.....	222	35	280	.....
Georgia.....	313,574	100	10,432	142,760	10,439,199	109,586	11,991,429	1,442,644	80	2,686	180	926	2,826	3,319	145
Idaho.....	360,653	1,047	11,717	191,086	11,716,334	111,584	13,501,058	1,673,170	5,603	15	.....	75	1,217	4,296	.....
Illinois.....	2,925,744	6,051	29,238	1,556,683	102,417,294	748,158	116,582,915	13,397,463	37,118	26,310	1,121	1,261	708	7,718	2,131
Indiana.....	2,272,538	606,485	16,150	660,578	64,984,283	755,752	75,111,435	9,371,400	39,341	22,596	1,710	2,917	3,188	8,930	4,240
Iowa.....	578,181	1,547	7,555	144,508	18,372,312	240,750	21,324,678	2,711,616	13,729	5,126	1,361	3,183	3,859	530	.....
Kansas.....	4,146,056	17,823	23,507	2,606,490	180,751,630	1,581,842	206,881,300	24,547,822	58,829	22,177	4,250	7,009	5,863	20,530	4,863
Kentucky.....	1,422,801	2,673	21,596	241,905	39,114,643	466,318	45,773,708	6,192,837	26,852	13,227	206	5,847	3,174	4,308	952
Louisiana.....	43,134	.....	2,094	3,128	1,179,353	8,591	1,384,074	196,130	600	20	.....	245	.....	335	.....
Maine.....	147,074	.....	10,684	26,199	4,677,570	31,602	5,442,728	733,556	4,744	115	75	290	2,015	2,249	.....
Maryland.....	449,132	3,612	22,100	93,553	16,188,388	189,083	19,004,166	2,646,698	11,351	2,909	45	1,929	3,772	2,696	40
Massachusetts.....	129,996	152	18,259	25,303	4,214,481	35,055	4,878,212	628,676	4,013	234	.....	120	1,162	2,497	.....
Michigan.....	1,256,772	10,144	43,809	251,841	37,776,280	408,815	44,144,434	5,959,339	29,928	9,560	845	2,044	9,767	7,712	2,210
Minnesota.....	7,780,555	46,933	669,266	3,355,611	335,682,145	2,190,367	381,248,891	43,376,379	114,764	36,591	14,316	1,017	32,420	30,420	18,947
Mississippi.....	48,678	150	3,391	14,847	1,879,641	17,167	2,091,663	194,855	1,634	450	.....	455	.....	729	.....
Missouri.....	3,153,880	8,615	33,305	692,342	97,131,800	1,052,924	113,297,359	15,112,635	47,546	25,646	250	6,321	2,623	12,716	535
Montana.....	474,533	.....	15,332	183,840	13,936,735	155,521	16,386,055	2,293,799	6,572	1,720	.....	529	250	4,073	125
Nebraska.....	1,240,076	11,405	14,515	305,462	47,078,841	480,459	53,521,388	5,962,088	21,851	5,415	225	3,742	4,720	7,752	760
Nevada.....	27,347	.....	640	6,271	981,807	9,508	11,116,199	124,884	482	40	77	190	175	.....	.....
New Hampshire.....	95,539	.....	1,312	53,955	2,914,745	11,569	3,391,346	465,032	2,942	665	.....	169	1,434	674	30
New Jersey.....	219,895	2,205	18,024	25,663	4,992,500	43,188	6,040,151	1,004,463	6,631	502	30	1,147	4,367	525	18
New Mexico.....	64,551	86	720	8,362	1,060,505	31,890	1,324,340	231,945	1,031	490	.....	456	361	324	.....
New York.....	3,390,791	28,767	188,015	920,031	134,849,794	783,934	155,272,104	19,638,376	67,328	14,221	2,761	7,276	19,311	23,757	1,877
North Carolina.....	583,406	6,480	9,113	174,320	20,765,483	280,106	24,258,213	3,212,624	17,148	3,419	1,592	5,695	6,442	85	.....
North Dakota.....	679,496	.....	1,245	173,707	25,901,190	321,905	29,282,056	3,058,961	9,664	7,407	85	1,362	250	860	688
Ohio.....	2,439,116	1,800	22,811	781,557	76,334,609	767,472	89,396,619	12,294,538	47,483	22,483	75	10,737	6,211	8,314	1,236
Oklahoma.....	1,021,017	3,800	5,695	726,115	43,812,330	367,765	49,843,800	5,063,705	16,573	7,590	39	5,007	238	3,699	1,031
Oregon.....	1,165,868	30,139	19,788	274,092	37,559,277	242,471	42,549,987	4,748,239	18,314	447	.....	402	3,147	9,318	34
Pennsylvania.....	2,259,132	8,884	103,521	228,614	59,440,485	544,302	69,446,449	9,461,662	55,928	14,734	180	8,333	23,093	9,558	454
Rhode Island.....	33,706	.....	875	7,133	993,405	14,414	1,132,723	154,904	1,253	220	.....	110	302	621	.....
South Carolina.....	44,147	.....	1,164	5,456	1,778,356	28,701	2,147,216	342,159	1,352	505	20	124	68	635	.....
South Dakota.....	282,601	6,332	3,121	67,715	7,751,928	139,170	8,873,203	952,105	5,399	2,602	75	1,081	295	1,316	81
Tennessee.....	1,281,085	52,004	12,245	333,300	44,753,314	423,033	51,912,531	8,736,184	27,533	13,563	25	3,955	6,176	3,814	292
Texas.....	1,680,663	15,957	22,474	668,418	62,884,614	515,057	73,064,361	9,664,690	23,854	8,296	5,694	828	9,036	1,674	.....
Utah.....	268,769	6,948	24,080	65,942	6,483,856	68,371	7,569,434	1,017,207	5,030	100	80	2,364	2,486	137	.....
Vermont.....	158,210	4,922	5,185	32,886	5,310,823	21,473	8,143,940	811,644	8,051	105	.....	288	5,081	2,577	260
Virginia.....	825,687	21,039	33,231	230,007	30,691,260	236,582	36,154,105	5,226,263	22,632	3,622	215	2,731	11,523	4,541	263
Washington.....	2,144,047	17,878	30,808	621,684	72,753,382	401,500	81,141,020	7,986,078	20,785	2,650	.....	305	1,984	15,846	260
West Virginia.....	377,890	1,105	7,103	114,739	10,417,968	112,461	13,076,542	2,546,113	8,704	2,425	3,297	1,480	1,502	513	.....
Wisconsin.....	1,560,828	3,217	134,723	540,005	51,249,929	486,955	58,304,432	6,567,548	30,245	7,740	25	1,332	9,333	11,815	881
Wyoming.....	48,648	.....	150	11,068	1,165,363	17,557	1,411,284	228,364	1,331	488	262	230	403	23	23

<sup>1</sup> Same number reported for one or more other months.

## MANUFACTURES.

TABLE 21.—CUSTOM MILLS—STATISTICS, BY STATES: 1919.

STATE.	Number of establish- ments.	PERSONS ENGAGED IN INDUSTRY.				Primary horse- power.	Capital.	Salaries.	Wages.	Cost of materials.	Value of products.	Value added by manufac- ture.
		Total.	Propri- etors and firm mem- bers.	Sala- ried em- ploy- ees.	Wage earners (aver- age num- ber).							
United States.....	10,427	14,828	12,449	245	2,134	218,894	\$28,871,215	\$174,881	\$1,778,936	\$78,957,305	\$94,784,528	\$15,827,133
Alabama.....	1,132	1,432	1,349	5	78	19,912	1,141,207	500	79,339	4,723,708	5,723,095	999,387
Arkansas.....	464	666	622	3	41	8,752	560,436	1,000	24,858	1,519,327	1,966,634	446,897
California.....	7	13	5	1	7	122	70,100	200	7,335	149,914	181,612	31,098
Colorado.....	7	10	5	1	4	165	66,095	1,050	4,891	107,640	120,683	13,043
Connecticut.....	47	64	49	1	14	1,410	228,560	1,750	14,774	412,611	498,748	56,137
De aware.....	5	6	5	—	1	148	9,250	—	900	29,583	36,595	7,012
Florida.....	99	124	118	—	6	1,843	128,237	—	9,475	380,305	476,075	95,770
Georgia.....	1,069	1,406	1,300	12	294	20,491	2,100,478	9,060	174,034	5,933,481	7,154,599	1,221,118
Idaho.....	6	8	5	1	2	204	16,560	750	2,803	113,812	127,833	14,021
Illinois.....	120	195	148	2	45	3,916	781,893	1,436	41,096	2,618,972	3,183,058	574,046
Indiana.....	131	232	130	36	66	4,134	1,441,720	16,754	45,926	1,515,593	1,772,733	257,140
Iowa.....	129	203	155	1	50	4,042	638,527	600	41,503	2,574,678	2,971,103	396,425
Kansas.....	28	30	24	1	5	679	157,938	300	4,024	185,531	234,955	49,424
Kentucky.....	783	981	938	2	41	8,925	716,116	1,200	27,007	2,177,063	2,665,859	488,796
Louisiana.....	60	70	74	—	5	1,212	55,312	—	4,839	143,276	177,607	34,331
Maine.....	22	30	23	1	6	630	122,027	300	5,026	250,530	316,107	56,577
Maryland.....	66	86	71	—	15	1,330	179,805	—	10,422	465,996	556,547	90,551
Massachusetts.....	10	16	12	—	4	390	46,384	—	4,292	129,747	151,159	21,412
Michigan.....	185	313	183	24	106	6,898	1,588,117	28,159	123,752	4,523,400	5,302,793	779,393
Minnesota.....	184	249	181	6	62	4,770	777,129	2,420	66,449	4,330,202	4,956,596	626,334
Mississippi.....	598	790	731	9	50	13,253	520,726	2,260	38,498	1,830,290	2,299,950	469,660
Missouri.....	251	332	296	1	35	4,126	549,902	636	25,212	1,071,773	1,318,391	246,018
Montana.....	7	8	3	1	4	236	59,554	1,200	5,730	95,954	110,073	20,119
Nebraska.....	6	8	6	—	2	122	68,492	—	2,400	33,368	41,030	7,662
New Hampshire.....	12	21	17	—	4	378	52,438	—	4,940	59,388	69,812	10,422
New Jersey.....	24	28	24	—	4	826	104,388	—	3,446	182,031	220,739	38,708
New Mexico.....	10	18	11	1	6	204	59,700	75	5,577	62,565	80,621	18,058
New York.....	225	359	267	6	86	8,920	1,515,530	14,253	88,332	2,539,732	3,127,533	587,806
North Carolina.....	552	784	663	1	120	11,942	1,416,853	—	107,032	4,345,080	5,184,332	889,302
North Dakota.....	98	109	89	2	18	2,036	357,070	1,543	15,682	1,800,135	2,124,877	324,542
Ohio.....	171	350	190	47	113	5,737	1,601,188	33,887	119,178	2,464,123	2,989,096	524,973
Oklahoma.....	96	120	114	—	6	1,510	185,028	—	5,826	350,847	431,380	80,513
Oregon.....	12	16	15	—	1	208	54,068	—	1,500	66,561	87,138	20,577
Pennsylvania.....	392	588	458	7	123	10,634	2,191,034	2,640	102,100	3,774,138	4,615,270	841,132
South Carolina.....	286	475	352	4	119	5,615	585,325	4,025	67,495	1,845,524	2,201,909	356,385
South Dakota.....	33	43	36	1	6	760	151,065	800	5,746	567,831	663,394	95,563
Tennessee.....	1,072	1,389	1,337	2	50	12,836	1,117,011	200	30,182	3,078,587	3,856,298	777,711
Texas.....	325	500	397	17	86	8,432	827,652	9,368	51,168	1,113,766	1,426,911	313,145
Utah.....	21	36	21	3	12	721	195,822	2,051	13,853	256,314	349,544	93,230
Vermont.....	25	40	28	—	12	783	117,108	—	9,717	249,189	328,573	80,384
Virginia.....	788	1,141	972	13	156	14,687	2,585,463	11,318	130,123	4,842,886	6,124,986	1,282,100
Washington.....	35	43	37	—	6	579	120,256	—	7,287	888,214	954,732	66,518
West Virginia.....	446	576	538	6	31	6,746	807,904	4,380	25,245	1,733,900	2,216,273	482,372
Wisconsin.....	382	688	431	27	230	17,735	2,784,440	20,776	220,272	13,883,729	15,339,562	1,956,133
All other states.....	5	21	19	—	2	95	8,334	—	2,050	26,540	30,578	4,038

DEPARTMENT OF COMMERCE  
BUREAU OF THE CENSUS  
WASHINGTON

FOURTEENTH CENSUS OF THE UNITED STATES  
MANUFACTURES: 1919

# MANUFACTURED GAS

Prepared under the supervision of EUGENE F. HARTLEY, Chief Statistician for Manufactures

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## EXPLANATION OF TERMS.

**Scope of census.**—Census statistics of manufactures are compiled primarily for the purpose of showing the absolute and relative magnitude of the different branches of industry covered and their growth or decline. Incidentally, the effort is made to present data throwing light upon character of ownership, size of establishments, and similar subjects. When use is made of the statistics for these purposes it is imperative that due attention be given to their limitations, particularly in connection with any attempt to derive from them figures purporting to show average wages, cost of production, or profits.

The census did not cover establishments which were idle during the entire year or for which products were valued at less than \$500, or the manufacturing done in educational, eleemosynary, and penal institutions.

**Period covered.**—The returns relate to the calendar year 1919, or the business year which corresponded most nearly to that calendar year, and cover a year's operations, except for establishments which began or discontinued business during the year.

**The establishment.**—As a rule, the term "establishment" represents a single plant or factory, but in some cases it represents two or more plants which were operated under a common ownership or for which one set of books of account was kept. If, however, the plants constituting an establishment as thus defined were not all located within the same city, county, or state, separate reports were secured in order that the figures for each plant might be included in the statistics for the city, county, or state in which it was located. In some instances separate reports were secured for different industries carried on in the same establishment.

**Classification by industries.**—The establishments were assigned to the several classes of industries according to their products of chief value. The products reported for a given industry may thus, on the one hand, include minor products different from those covered by the class designation, and, on the other hand, may not represent the total product covered by this designation, because some products of this class may be made in establishments in which it is not the product of chief value.

**Influence of increased prices.**—In comparing figures for cost of materials, value of products, and value added by manufacture in 1919 with the corresponding figures for earlier censuses, account should be taken of the general increase in the prices of commodities during recent years. To the extent to which this factor has been influential the figures fail to afford an exact measure of the increase in the volume of business.

**Persons engaged in the industry.**—The following general classes of persons engaged in the manufacturing industries were distinguished: (1) Proprietors and firm members, (2) salaried officers of corporations, (3) superintendents and managers, (4) clerks (including other subordinate salaried employees), and (5) wage earners.

The number of persons engaged in each industry, segregated by sex, and, in the case of wage earners, also by age (whether under 16 or 16 and over), was reported for a single representative day. The 15th of December was selected as representing for most industries normal conditions of employment, but where this date did not portray such conditions, an earlier date was requested.

In the case of employees other than wage earners the number thus reported for the representative date has been treated as equivalent to the average for the year, since the number of employees of this class does not ordinarily vary much from month to month. In the case of wage earners the average has been obtained in the manner explained in the next paragraph.

In addition to the more detailed report by sex and age of the number of wage earners on the representative date, a report was obtained of the number employed on the 15th of each month, by sex, without distinction of age. From these figures the average number of wage earners for the year has been calculated by dividing the sum of the numbers reported for the several months by 12. The importance of the industry as an employer of labor is believed to be more accurately measured by this average than by the number employed at any one time or on a given day.

The number of wage earners reported for the representative day, though given in certain tables for each separate industry, is not totaled for all industries combined, because, in view of the variations of date, such a total is not believed to be significant. It would involve more or less duplication of persons working in different industries at different times, would not represent the total number employed in all industries at any one time, and would give an undue weight to seasonal industries as compared with industries in continual operation.

In order to determine as nearly as possible the age distribution of the average number of wage earners for an industry, the per cent distribution by age of the wage earners for December 15, or the nearest representative day, has been calculated from the actual numbers reported for that date. The percentages thus obtained have been applied to the average number of wage earners for the year to determine the average numbers 16 years and over, and under 16, employed.

**Salaries and wages.**—Under these heads are given the total payments during the year for salaries and wages, respectively. The Census Bureau has not undertaken to calculate the average annual earnings of either salaried employees or wage earners. Such averages would possess little real value, because they would be based on the earnings of employees of both sexes, of all ages, and of widely varying degrees of skill. Furthermore, so far as wage earners are concerned, it would be impossible to calcu-

late accurately even so simple an average as this, since the number of wage earners fluctuates from month to month in every industry, and in some cases to a very great extent. The Census Bureau's figures for wage earners, as already explained, are averages based on the number employed on the 15th of each month, and while representing the number according to the pay rolls to whom wages were paid on that date, no doubt represent a larger number than would be required to perform the work in any industry if all were continuously employed during the year.

**Prevailing hours of labor.**—No attempt was made to ascertain the number of wage earners working a given number of hours per week. The inquiry called merely for the prevailing practice followed in each establishment. Occasional variations in hours in an establishment from one part of the year to another were disregarded, and no attention was paid to the fact that a few wage earners might have hours differing from those of the majority. All the wage earners of each establishment are therefore counted in the class within which the establishment itself falls. In most establishments, however, practically all the wage earners work the same number of hours, so that the figures give a substantially correct representation of the hours of labor.

**Capital (amount actually invested).**—The instructions on the schedule for securing data relating to capital were as follows:

"The answer should show the total amount of capital, both owned and borrowed, on the last day of the business year reported. All the items of fixed and live capital may be taken at the amounts carried on the books. If land or buildings are rented, that fact should be stated and no value given. If a part of the land or buildings is owned, the remainder being rented, that fact should be so stated and only the value of the owned property given. Do not include securities and loans representing investments in other enterprises."

These instructions were identical with those employed at the censuses of 1910 and 1920. The data compiled in respect to capital, however, at both censuses, as well as at all preceding censuses of manufactures, have been so defective as to be of little value except as indicating general conditions. In fact, it has been repeatedly recommended by the census authorities that this inquiry be omitted from the schedule. While there are some establishments whose accounting systems are such that an accurate return for capital could be made, this is not true of the great majority, and the figures therefore do not show the actual amount of capital invested.

**Materials.**—The statistics as to cost of materials relate to the materials used during the year, which may be more or less than the materials purchased during the year. The term "materials" covers fuel, rent of power and heat, mill supplies, and containers, as well as materials which form a constituent part of the product.

**Rent and taxes.**—The taxes include certain Federal taxes and state, county, and local taxes. Under "Federal taxes" there are included the internal revenue tax on manufactures (tobacco, beverages, etc.), excise taxes when included in values reported for products, corporation capital stock tax, and corporation income tax, but not the income tax for individuals and partners.

**Value of products.**—The amounts given under this heading represent the selling value or price at the factory of all products manufactured during the year, which may differ from the value of the products sold.

**Value added by manufacture.**—The value of products is not always a satisfactory measure of either the absolute or the relative importance of a given industry, because only a part of this value is actually created by the manufacturing processes carried on in the industry itself. Another part, and often by far the larger one, represents the value of the materials used. For many purposes, therefore, the best measure of the importance of an industry, from a manufacturing standpoint, is the value created by the manufacturing operations carried on within the industry. This value is calculated by deducting the cost of the materials used from the value of the products. The figure thus obtained is termed in the census reports "value added by manufacture."

**Cost of manufacture and profits.**—The census data do not show the entire cost of manufacture, and consequently can not be used for the calculation of profits. No account has been taken of depreciation or interest, rent of offices and buildings other than factory or works, insurance, ordinary repairs, advertising, and other sundry expenses.

**Primary horsepower.**—This item represents the total primary power equipment of the manufacturing establishments plus the amount of power, principally electric, rented from other concerns. It does not cover the power of electric motors taking their current from dynamos driven by primary power machines operated by the same establishment, because the inclusion of such power would obviously result in duplication. The figures for primary horsepower represent the rated capacity of the engines, motors, etc., and not the amount of power in actual daily use.

**Fuel.**—Statistics of the quantity of fuel used are shown only for anthracite and bituminous coal, coke, fuel oils, gasoline and other volatile oils, and gas, and represent the quantity used during the year. As only the principal kinds of fuel are shown, comparison as to the total cost of all fuel is impracticable.

# MANUFACTURED GAS.

## GENERAL STATISTICS.

**General character of the industry.**—The census report on the gas industry covers establishments, both private and municipal, engaged in the commercial manufacture of gas delivered through mains, for illuminating, household, and industrial purposes, together with Pintsch gas, which is used principally for lighting railway cars and is delivered direct from the plant to pressure containers on the cars. In accordance with the above definition the production of gas for the exclusive use of the establishment producing it is not included, and the report does not cover blast-furnace gas nor that of by-product coke ovens. A considerable amount of the latter, however, is purchased by commercial gas plants and used as an ingredient in manufactured gas. The statistics for acetylene sold in containers by establishments having no distributing mains, formerly included in the report on manufactured gas, will be found in the section of the report on the chemical industry, pertaining to compressed and liquefied gases. Nonmanufacturing establishments which buy gas for distribution to consumers without change or treatment are omitted as engaged in mercantile operations only.

The products of the gas industry include not only the various kinds of gas—coal gas, carbureted water gas, mixed coal and water gas, oil gas, acetylene, gasoline (cold-process) gas, and enriched natural gas—but their by-products, such as coke, tar, ammonia, naphthalene, and light oil and derivatives, benzol, toluol, solvent naphtha, etc. Very few gas plants carry their operations as far as the segregation of the tar and oil derivatives.

A product now shown for the first time is enriched natural gas, or natural gas mixed with a certain proportion of manufactured gas. No plant reported at this census the production for sale of straight water gas or "blue gas."

Statistics for the industry were presented at the census of 1849 and at each subsequent census except that of 1879. A brief historical sketch of the industry is contained in the report for the census of 1889.

**Comparative summary.**—Table 1 summarizes the statistics of the industry for each census from 1889 to 1919, inclusive, and shows percentages of increase for each five-year period.

**Principal states, ranked by value of products.**—Table 2 summarizes the more important statistics for the industry, by states, ranked according to value of products.

**Persons engaged in the industry.**—The age classification of the average number of wage earners in Table 3 is estimated by the method described in the "Explanation of terms." Figures for states will be found in Table 31.

**Wage earners, by months.**—The statistics for wage earners, Table 4, are intended to show the steadiness of employment, or the reverse, in accordance with the industrial conditions existing during the year. Females constitute but six-tenths of 1 per cent of the total number, and were reported in relatively few cases.

**Pervailing hours of labor.**—Table 5 shows a marked shortening of the working-day since 1909. In that year 88.6 per cent of the wage earners were employed in establishments where the prevailing hours of labor per week were 60 and over, and 73 per cent where they were "Over 60." The movement toward shortening the hours of labor reduced these percentages in 1914 to 52.5 and 31.4 per cent, respectively, and in 1919 to 25.4 per cent for establishments working 60 hours per week and over and to 13.4 per cent for over 60 per week. On the other hand, the hour groups of 48 per week and less constituted but 1.3 per cent of the total number in 1909, 6.7 per cent in 1914, and 35.9 per cent in 1919. The change is notably marked in Maryland, Michigan, New Jersey, and New York.

**Size of establishments, by average number of wage earners.**—Analysis of Table 6 discloses the fact that in 1919 the average number of wage earners for all plants was 42 as compared with 34 in 1914.

**Size of establishments, by value of products.**—Table 7 shows that, measured by value of products, the growth has been in the higher groups; those with products "Less than \$5,000" and "\$5,000 to \$20,000," showing progressively for each census fewer in number of establishments, wage earners, and value of products. The average value of products per establishment was \$129,000 in 1909, \$172,000 in 1914, and \$322,000 in 1919, though the increase in average value added by manufacture was relatively much less—\$88,000 in 1909, \$112,000 in 1914, and \$168,000 in 1919.

**Character of ownership.**—Table 8 presents the statistics bearing upon the character of ownership or legal organization of the establishments in the industry; municipally owned establishments, 57 in number in 1919 and 138 in 1914, are a factor. The statistics for the municipal plants will be found in Table 29.

## MANUFACTURES.

**Number and horsepower of types of prime movers.**—Table 9 presents the statistics concerning power. Of the total primary power, 23.2 per cent were utilized in the form of electric power purchased or generated by the establishments reporting, in 1919; 15.8 per cent in 1914; and 13.5 per cent in 1909.

**Fuel consumed.**—Table 10 presents the statistics for fuel, by kinds and by states, for 1919 and 1914.

The statistics include fuel for all purposes, both as material for gas making and for boilers and retorts. The figures for the fuel used as materials in gas making are shown in Table 12, and by states in Table 15. These relate to the purchased fuels and do not include products of the plants that are made and consumed. The figures for gas include both natural and manufactured gas (purchased), chiefly natural gas.

TABLE 1.—COMPARATIVE SUMMARY: 1919, 1914, 1909, 1904, 1899, AND 1889.

	1919	1914	1909	1904	1899	1889	PER CENT OF INCREASE. <sup>1</sup>				
							1914-1919	1909-1914	1904-1909	1899-1904	1889-1899
Number of establishments.....	1,022	1,284	1,296	1,019	877	742	-20.4	-0.9	27.2	16.2	18.2
Persons engaged.....	63,328	63,993	51,007	40,043	28,363	(2)	-1.0	25.5	27.4	41.2	.....
Proprietors and firm members.....	27	78	277	71	(2)	.....	-71.8	290.1	.....	.....	.....
Salaried employees.....	20,393	20,123	13,515	9,406	5,904	(2)	-1.3	48.9	43.7	59.3	.....
Wage earners (average number).....	42,908	43,792	37,215	30,566	22,459	12,996	-2.0	17.7	21.8	36.1	72.8
Primary horsepower.....	238,467	215,715	128,350	73,101	31,797	26,475	10.5	68.1	75.6	129.9	20.1
Capital.....	\$1,465,656,265	\$1,252,421,584	\$915,536,762	\$725,035,204	\$567,000,506	\$258,771,795	17.0	36.8	26.3	27.9	119.1
Salaries and wages.....	\$77,931,081	\$44,330,684	\$33,316,068	\$25,521,616	\$17,709,796	(2)	75.8	33.1	30.5	44.1	.....
Salaries.....	\$25,172,453	\$17,529,020	\$12,385,371	\$5,403,639	\$5,273,500	(2)	43.6	41.5	46.3	60.5	.....
Wages.....	\$52,758,628	\$26,801,664	\$20,930,037	\$17,057,917	\$12,436,290	\$8,499,625	96.8	28.0	22.7	37.2	40.3
Paid for contract work.....	\$463,280	\$551,760	\$114,570	\$288,452	(2)	(2)	-16.0	381.5	-60.3	.....	.....
Rent and taxes.....	\$22,889,015	\$13,388,969	\$7,830,275	\$4,250,790	(2)	(2)	71.0	70.8	25.4	.....	.....
Cost of materials.....	\$157,550,882	\$76,779,288	\$52,427,544	\$41,193,951	\$20,605,356	\$14,037,087	105.2	46.4	27.3	99.9	46.8
Value of products.....	\$329,278,908	\$220,237,790	\$166,814,371	\$123,144,945	\$75,716,693	\$56,987,290	49.5	32.0	33.3	65.3	32.9
Value added by manufacture <sup>2</sup> .....	\$171,728,026	\$143,458,502	\$114,386,527	\$83,950,994	\$55,111,337	\$42,950,203	19.7	25.4	36.3	52.3	28.3
Gas production—1,000 cubic feet.....	344,119,811	203,639,260	150,835,793	112,549,979	67,093,553	36,519,512	69.0	35.0	34.0	67.7	83.7

<sup>1</sup> A minus sign (—) denotes decrease.<sup>2</sup> Figures not available.<sup>3</sup> Exclusive of internal revenue.<sup>4</sup> Value of products less cost of materials.

TABLE 2.—PRINCIPAL STATES, RANKED BY VALUE OF PRODUCTS: 1919.

STATE.	Num- ber of estab- lish- ments	WAGE EARNERS.			VALUE OF PRODUCTS.			VALUE ADDED BY MANUFACTURE.			STATE.	Num- ber of estab- lish- ments	WAGE EARNERS.			VALUE OF PRODUCTS.			VALUE ADDED BY MANUFACTURE.		
		Aver- age num- ber.	Per cent dis- tribu- tion.	Rank.	Amount ex- pressed in thou- sands.	Per cent dis- tribu- tion.	Rank.	Amount ex- pressed in thou- sands.	Per cent dis- tribu- tion.	Rank.			Aver- age num- ber.	Per cent dis- tribu- tion.	Rank.	Amount ex- pressed in thou- sands.	Per cent dis- tribu- tion.	Rank.	Amount ex- pressed in thou- sands.	Per cent dis- tribu- tion.	Rank.
United States.....	1,022	42,908	100.0	...	\$329,270	100.0	...	\$171,728	100.0	...	Louisiana.....	4	250	0.6	27	2,636	0.8	23	1,467	0.9	22
New York.....	96	8,409	19.6	1	69,339	21.1	1	28,189	16.4	1	Nebraska.....	20	291	0.7	26	2,446	0.7	24	1,311	0.8	23
Illinois.....	70	4,230	10.3	2	26,930	11.2	2	19,038	11.1	2	Florida.....	14	418	1.0	23	1,989	0.6	25	1,006	0.6	24
Pennsylvania.....	86	5,324	7.7	3	31,598	9.6	3	14,268	8.3	3	Tennessee.....	10	474	1.1	21	1,801	0.5	26	950	0.6	25
Massachusetts.....	51	2,654	6.2	5	24,231	7.4	4	13,458	7.8	4	Alabama.....	12	522	1.2	18	1,646	0.5	27	884	0.5	26
California.....	57	2,444	5.7	6	20,441	6.2	5	12,441	7.2	6	North Carolina.....	22	341	0.8	24	1,521	0.5	28	844	0.5	27
New Jersey.....	38	2,083	4.9	7	20,317	6.2	6	12,943	7.5	5	Maine.....	13	220	0.5	28	1,381	0.4	29	734	0.4	28
Michigan.....	59	2,346	6.6	4	17,993	5.5	7	9,723	5.7	7	New Hampshire.....	13	209	0.5	30	1,195	0.4	30	666	0.4	29
Indiana.....	53	1,902	4.4	8	12,454	3.8	8	5,843	3.4	9	Delaware.....	7	145	0.3	33	1,053	0.3	31	604	0.3	30
Missouri.....	26	1,318	3.1	9	11,113	3.4	9	8,117	4.7	8	South Carolina.....	10	219	0.5	29	947	0.3	32	472	0.3	33
Connecticut.....	22	1,270	3.0	11	8,347	2.5	10	5,157	3.0	10	Ohio.....	15	162	0.4	32	887	0.3	33	530	0.3	31
Wisconsin.....	34	1,294	3.0	10	8,153	2.5	11	4,578	2.7	11	Utah.....	4	172	0.4	31	790	0.2	34	495	0.3	32
Maryland.....	16	875	2.0	12	6,448	2.0	12	3,500	2.1	12	Arizona.....	9	63	0.1	38	691	0.2	35	341	0.2	34
Iowa.....	68	727	1.7	13	5,738	1.7	13	3,096	1.8	14	Delaware.....	12	80	0.2	37	613	0.2	36	294	0.2	35
Minnesota.....	23	707	1.6	14	5,518	1.7	14	3,110	1.8	13	Montana.....	6	63	0.1	38	487	0.1	37	290	0.2	36
Rhode Island.....	4	670	1.6	15	4,478	1.4	15	2,405	1.4	15	Vermont.....	9	87	0.2	36	486	0.1	38	264	0.2	37
Washington.....	12	637	1.5	17	3,680	1.1	17	2,074	1.2	17	Mississippi.....	7	122	0.3	34	411	0.1	39	207	0.1	40
Texas.....	25	643	1.5	16	3,614	1.1	18	2,027	1.2	18	Kansas.....	7	52	0.1	39	400	0.1	40	245	0.1	38
Virginia.....	17	475	1.1	20	3,150	1.0	19	1,693	1.0	19	North Dakota.....	5	43	0.1	40	384	0.1	41	229	0.1	39
Georgia.....	17	486	1.1	19	3,005	0.9	20	1,486	0.9	21	Kentucky.....	10	90	0.2	35	340	0.1	42	180	0.1	41
Oregon.....	11	334	0.8	25	2,927	0.9	21	2,109	1.2	16	Idaho.....	4	35	0.1	41	241	0.1	43	150	0.1	42
Colorado.....	10	448	1.0	22	2,649	0.8	22	1,648	1.0	20	West Virginia.....	3	29	0.1	42	96	(1)	46	44	(1)	45
All other States <sup>2</sup> .....	11	845	2.0	...	...	...	...	...	...	...	All other States <sup>2</sup> .....	11	845	2.0	...	4,715	1.4	...	2,538	1.5	...

<sup>1</sup> Less than one-tenth of 1 per cent.<sup>2</sup> Includes District of Columbia, rank 16, according to value of products.

## MANUFACTURED GAS.

TABLE 3.—PERSONS ENGAGED IN THE INDUSTRY, 1919, 1914, AND 1909.

CLASS.	Cen-sus year.	Total.	Male.	Fe-male.	PER CENT OF TOTAL.		CLASS.	Cen-sus year.	Total.	Male.	Fe-male.	PER CENT OF TOTAL.	
					Male.	Fe-male.						Male.	Female.
					Male.	Female.						Male.	Female.
All classes.....	1919	63,328	57,164	6,164	90.4	9.6	Clerks and other subordinate salaried employees.	1919	16,969	11,088	5,881	65.3	34.7
	1914	63,983	61,156	2,837	95.6	4.4		1914	17,214	14,593	2,621	84.8	15.2
	1909	51,007	49,231	1,776	96.5	3.5		1909	10,806	9,121	1,685	84.4	15.6
Proprietors and officials.....	1919	3,451	3,417	34	99.0	1.0	Wage earners (average number).....	1919	42,908	42,659	249	99.4	0.6
	1914	2,987	2,968	19	99.4	0.6		1914	43,792	43,595	197	99.6	0.4
	1909	2,986	2,967	19	99.4	0.6		1909	37,215	37,143	72	99.8	0.2
Proprietors and firm members.....	1919	27	27	2	100.0	2.6	16 years of age and over.....	1919	42,887	42,638	249	99.4	0.6
	1914	78	76	2	97.4	2.6		1914	43,764	43,567	197	99.5	0.5
	1909	277	273	4	98.6	1.4		1909	37,198	37,127	71	99.8	0.2
Salaried officers of corporations.....	1919	901	882	19	97.9	2.1	Under 16 years of age.....	1919	21	21	-----	100.0	-----
	1914	954	941	13	98.6	1.4		1914	28	28	-----	100.0	-----
	1909	990	981	9	99.1	0.9		1909	17	16	1	94.1	5.9
Superintendents and managers.....	1919	2,523	2,508	15	99.4	0.6							
	1914	1,955	1,951	4	99.8	0.2							
	1909	1,719	1,713	6	99.7	0.3							

TABLE 4.—WAGE EARNERS, BY MONTHS, FOR SELECTED STATES: 1919.

[The month of maximum employment for each state is indicated by bold-faced figures and that of minimum employment by italic figures.]

STATE.	Average number em-ployed during year.	NUMBER EMPLOYED ON 15TH DAY OF THE MONTH OR NEAREST REPRESENTATIVE DAY.											Per cent mini-mum is of maxi-mum.	
		Janu- ary.	Febr- uary.	March.	April.	May.	June.	July.	August.	Septem- ber.	Octo- ber.	Novem- ber.	Decem- ber.	
United States:														
1919.....	42,908	43,793	42,220	41,549	41,750	42,122	42,338	43,237	43,231	42,554	43,751	44,058	44,280	93.8
Male.....	42,059	43,483	41,932	41,293	41,491	41,879	42,114	42,987	42,972	42,298	43,543	43,860	44,076	93.7
Female.....	249	310	288	256	259	243	224	270	259	256	211	203	204	65.8
1914.....	43,792	41,603	41,017	41,488	44,276	47,201	47,572	46,962	45,772	44,213	42,999	41,404	40,994	86.2
1909.....	37,215	33,115	32,502	34,314	37,422	39,455	40,412	38,480	37,800	38,065	37,566	37,122	37,122	80.6
Alabama.....	522	507	521	526	520	496	497	550	528	519	518	521	558	88.9
California.....	2,414	2,208	2,079	2,140	2,330	2,378	2,452	2,508	2,490	2,438	2,714	2,851	2,736	72.9
Connecticut.....	1,270	1,279	1,255	1,257	1,244	1,278	1,300	1,288	1,331	1,288	1,249	1,229	1,249	92.3
Illinois.....	4,430	4,988	4,558	4,414	4,268	4,382	4,262	4,341	4,432	4,258	4,391	4,395	4,473	85.6
Indiana.....	1,902	1,915	1,925	1,882	1,816	1,786	1,811	1,935	1,987	1,905	1,938	1,838	1,838	89.9
Iowa.....	727	727	696	714	732	729	711	718	728	748	730	741	750	92.8
Maryland.....	875	803	718	738	767	747	834	967	988	977	988	982	960	74.7
Massachusetts.....	2,651	2,738	2,729	2,689	2,688	2,726	2,687	2,698	2,656	2,424	2,606	2,581	2,638	88.5
Michigan.....	2,816	2,557	2,887	2,478	2,508	2,679	2,751	8,032	2,984	3,018	3,145	3,274	3,275	72.9
Minnesota.....	707	661	632	639	699	751	783	701	681	706	744	751	736	80.7
Missouri.....	1,318	1,419	1,373	1,305	1,201	1,289	1,265	1,280	1,287	1,289	1,320	1,333	1,355	89.1
New Jersey.....	2,083	2,803	2,176	2,012	1,924	2,057	2,077	2,188	2,032	2,029	2,029	2,057	2,072	83.5
New York.....	8,409	8,636	8,351	8,338	8,380	8,514	8,425	8,500	8,420	8,076	8,238	8,583	8,440	93.5
Pennsylvania.....	3,324	3,532	3,518	3,405	3,363	3,262	3,256	3,265	3,223	3,275	3,308	3,224	3,257	91.3
Rhode Island.....	670	1,001	948	844	766	624	558	545	598	542	555	563	586	50.7
Texas.....	643	610	637	621	633	603	597	622	625	658	692	655	693	86.1
Washington.....	637	558	553	539	566	578	591	629	646	731	772	742	759	69.0
Wisconsin.....	1,294	1,228	1,174	1,207	1,310	1,311	1,341	1,351	1,343	1,313	1,320	1,289	1,314	88.9

## MANUFACTURES.

TABLE 5.—AVERAGE NUMBER OF WAGE EARNERS, BY PREVAILING HOURS OF LABOR PER WEEK, FOR SELECTED STATES: 1919 AND 1914.

<sup>1</sup> Includes 48 and under for 1914 and 1909.

<sup>a</sup> Corresponding figures not available.

<sup>2</sup> Included with "All other states," in 1914.

TABLE 6.—SIZE OF ESTABLISHMENTS, BY AVERAGE NUMBER OF WAGE EARNERS, FOR SELECTED STATES: 1919.

# MANUFACTURED GAS.

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TABLE 7.—SIZE OF ESTABLISHMENTS, BY VALUE OF PRODUCTS: 1919, 1914, AND 1909.

VALUE OF PRODUCT.	NUMBER OF ESTABLISHMENTS.			AVERAGE NUMBER OF WAGE EARNERS.			VALUE OF PRODUCTS.			VALUE ADDED BY MANUFACTURE.		
	1919	1914	1909	1919	1914	1909	1919	1914	1909	1919	1914	1909
All classes.....	1,022	1,284	1,206	42,908	43,792	37,215	\$329,278,908	\$220,237,790	\$166,814,371	\$171,728,026	\$143,458,502	\$114,386,527
Less than \$5,000.....	74	285	356	64	271	297	160,543	582,774	764,347	37,958	229,051	324,348
\$5,000 to \$20,000.....	180	320	371	552	1,151	1,364	2,389,388	3,817,047	4,445,249	1,122,025	2,228,239	2,732,484
\$20,000 to \$100,000.....	455	436	369	4,160	5,145	4,930	21,489,375	20,032,768	16,863,851	11,506,282	12,550,279	10,933,845
\$100,000 to \$500,000.....	208	177	172	7,732	14,468	13,274	{ 46,808,456	42,568,602	48,345,467	{ 26,240,590	{ 19,238,041	{ 40,117,718
\$500,000 to \$1,000,000.....	48	27	172	{ 5,122	{ 14,468	{ 13,274	{ 35,035,040	{ 17,842,850	{ 96,395,457	{ 113,553,130	{ 88,033,215	{ 33,709,342
\$1,000,000 and over.....	57	39	28	25,298	22,757	17,350	223,398,106	135,393,149	96,395,457	66,680,508		
PER CENT DISTRIBUTION.												
All classes.....	100.0	00.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Less than \$5,000.....	7.2	22.2	27.5	0.1	0.6	0.8	(1)	0.3	0.5	(1)	0.2	0.3
\$5,000 to \$20,000.....	17.6	24.9	28.6	1.2	2.6	3.7	0.7	1.7	2.7	0.7	1.5	2.4
\$20,000 to \$100,000.....	44.5	34.0	28.5	9.7	11.8	13.2	6.5	9.1	10.1	6.7	9.0	9.5
\$100,000 to \$500,000.....	20.4	13.8	13.3	{ 18.0	{ 33.0	{ 35.7	{ 14.2	{ 19.3	{ 29.0	{ 15.3	{ 28.0	{ 29.5
\$500,000 to \$1,000,000.....	4.7	2.1	13.3	{ 11.9	{ 52.0	{ 46.6	{ 10.6	{ 8.1	{ 61.5	{ 11.2	{ 61.3	{ 58.3
\$1,000,000 and over.....	5.6	3.0	2.2	59.0	67.9	57.8						

<sup>1</sup> Less than one-tenth of 1 per cent.

TABLE 8.—CHARACTER OF OWNERSHIP: 1919, 1914, AND 1909.

CHARACTER OF OWNERSHIP.	NUMBER OF ESTABLISHMENTS.			VALUE OF PRODUCTS.			CHARACTER OF OWNERSHIP.	NUMBER OF ESTABLISHMENTS.			VALUE OF PRODUCTS.		
	1919	1914	1909	1919	1914	1909		1919	1914	1909	1919	1914	1909
Total.....	1,022	1,284	1,296	\$329,278,908	\$220,237,790	\$166,814,371	Percent of total.	100.0	100.0	100.0	100.0	100.0	100.0
Individual.....	113	34	48	1,349,820	99,016	114,851	Individual.....	1.3	2.6	3.7	0.4	(3)	0.1
Corporation.....	951	1,101	1,091	325,164,125	218,306,024	165,108,539	Corporation.....	93.0	85.8	84.2	98.8	99.1	99.0
Other.....	258	149	157	2,764,963	1,832,750	1,590,981	Other.....	5.7	11.6	12.1	0.8	0.8	1.0

<sup>1</sup> Distributed by states as follows: New York, 3 establishments; and 1 each in California, Delaware, Georgia, Indiana, Iowa, Missouri, Nebraska, Oklahoma, South Dakota, and Wisconsin.

<sup>2</sup> Distributed by states as follows: Iowa, 7 establishments; Minnesota, 7; Virginia, 5; Georgia, 4; Michigan, 4; Maryland, 3; North Carolina, 3; South Dakota, 3; 2 each in Florida, Massachusetts, Nebraska, New York, Ohio, and Pennsylvania; and 1 each in Alabama, Arizona, California, Connecticut, Illinois, Kentucky, Maine, New Jersey, North Dakota, and Wisconsin.

<sup>3</sup> Less than one-tenth of 1 per cent.

TABLE 9.—NUMBER AND HORSEPOWER OF TYPES OF PRIME MOVERS: 1919, 1914, AND 1909.

POWER.	NUMBER OF ENGINES OR MOTORS.			HORSEPOWER.					
	1919	1914	1909	Amount.			Per cent distribution.		
				1919	1914	1909	1919	1914	1909
Primary power, total.....	5,095	4,975	3,521	238,467	213,370	128,350	100.0	100.0	100.0
Owned.....	3,682	3,634	3,285	205,091	194,032	125,456	86.0	91.0	97.7
Steam.....	3,518	3,352	2,969	197,321	179,878	115,514	82.7	84.4	95.6
Engines.....	2,868	(2)	(2)	148,393	(2)	(2)	62.2	-----	-----
Turbines.....	650	(2)	(2)	48,928	(2)	(2)	20.5	-----	-----
Internal-combustion engines.....	151	208	281	7,574	13,729	7,128	3.2	6.4	5.6
Water wheels, turbines, and motors.....	13	14	35	196	425	2,814	0.1	0.2	2.1
Rented.....	1,413	1,341	236	33,376	19,838	2,894	14.0	9.0	2.3
Electric.....	1,413	1,341	236	33,363	19,271	2,723	14.0	9.0	2.1
Other.....				13	67	171	(3)	(3)	0
Electric.....	3,235	2,349	935	55,403	37,881	17,336	100.0	100.0	100.0
Rented.....	1,413	1,341	236	33,363	19,271	2,723	60.2	49.6	15.7
Generated by establishments reporting.....	1,822	1,098	699	22,040	18,610	14,613	39.8	50.4	84.3

<sup>1</sup> Figures for horsepower include for 1909 the amount reported under the head of "Other" owned power.

<sup>2</sup> Not reported separately.

<sup>3</sup> Less than one-tenth of 1 per cent.

## MANUFACTURES.

TABLE 10.—FUEL CONSUMED, BY STATES: 1919, AND 1914.

STATE.	Cen-sus year.	COAL.		Coke (tons, 2,000 pounds).	Fuel oils (barrels).	Gasoline and other volatile oils (barrels).	Gas (1,000 cubic feet).
		Anthracite <sup>1</sup> (tons, 2,240 pounds).	Bituminous (tons, 2,000 pounds).				
United States.....	1919	1,388,467	7,383,687	1,497,435	19,069,171	126,629	641,288
	1914	9,17,261	6,078,299	1,081,217	13,482,655	(2)	2,710,516
Alabama <sup>2</sup> .....	1919		82,699		50,467		
Arizona <sup>1</sup> .....	1919			550	87,244		
California.....	1919	223	2,851		3,004,166	17,736	304,868
	1914	41	255		2,607,663	(2)	1,880,765
Colorado <sup>2</sup> .....	1919		138,045	3,054	42,347		
Connecticut.....	1919	49,870	224,434	47,148	483,278	127	969
	1914	47,312	128,603	5,273	213,866	(2)	6,461
Delaware <sup>1</sup> .....	1919	15,173	6,301		77,004	1	
Florida <sup>1</sup> .....	1919	3,360	38,473		48,867	8,607	
Georgia.....	1919		103,074	9,339	101,095	11,512	50
	1914	24	81,131	6,300	66,341	(2)	
Idaho <sup>1</sup> .....	1919		9,544	1,288	1,644		
Illinois.....	1919	77,309	619,318	487,850	2,147,811	196	4,748
	1914	8,601	445,792	355,214	1,939,987	(2)	12,167
Indiana.....	1919	2,697	830,850	48,769	182,348	240	234,574
	1914	132	657,483	22,003	152,170	(2)	
Iowa.....	1919	3,403	82,523	81,222	398,128	5,684	
	1914	894	108,992	35,229	172,719	(2)	2,705
Kansas <sup>2</sup> .....	1919		8,713	643	12,405	5	
Kentucky <sup>1</sup> .....	1919		15,543	1,110	5,634		
Louisiana <sup>1</sup> .....	1919		24,488	32,817	143,407		
Maine <sup>1</sup> .....	1919	3,891	48,341	11,628	15,142		
Maryland.....	1919	4,218	52,598		16,084		
	1914	63,069	27,414	895	236,911	(2)	
Massachusetts.....	1919	116,577	572,102	119,862	1,785,175	17,762	
	1914	16,801	546,118	81,595	557,485	(2)	450
Michigan.....	1919	45	834,391	3,832	411,562		598
	1914	407	622,240	9,851	116,564	(2)	
Minnesota.....	1919		116,968	16,550	204,251	1,102	
	1914	90	130,552	26,564	207,451	(2)	5,018
Mississippi <sup>2</sup> .....	1919		23,466	1,194	3,391		
Missouri.....	1919		702,610	24,807	194,082		
	1914	208	330,095	92,828	286,489	(2)	40,494
Montana <sup>2</sup> .....	1919		17,072	1,730	7,984		
Nebraska <sup>1</sup> .....	1919		17,423	28,496	130,291	2,400	19,000
New Hampshire <sup>2</sup> .....	1919	4,653	19,306	8,825	22,538	23,401	96
New Jersey.....	1919	151,379	100,095	107,560	1,023,324	5,554	
	1914	159,480	115,988	27,543	870,820	(2)	
New York.....	1919	713,681	1,012,831	142,888	5,101,564	4,353	
	1914	481,047	1,145,803	112,988	3,957,246	(2)	
North Carolina <sup>2</sup> .....	1919		59,303	4,011	24,733		
North Dakota <sup>2</sup> .....	1919		15,839	625	1,620		
Ohio <sup>1</sup> .....	1919	1,010	43,067	2,692	12,754	96	18,680
Oregon <sup>1</sup> .....	1910		4,492	785	585,235		
Pennsylvania.....	1919	148,083	523,280	180,280	1,537,456	17,824	27,825
	1914	87,443	412,849	115,817	287,712	(2)	51,117
Rhode Island.....	1919	15,694	179,406	4,682	113,823	7,237	
	1914	11,646	109,341		110,873	(2)	
South Carolina <sup>2</sup> .....	1919	550	19,064	9,505	24,110		
South Dakota <sup>2</sup> .....	1919		8,635	7,852	54,548	149	
Tennessee.....	1919		99,496	230	57,124		
	1914		63,275	13,386	45,767	(2)	
Texas.....	1919	2,864	25,606	42,728	213,413		29,880
	1914	2,021	15,983	21,136	142,051	(2)	170,912
Utah <sup>1</sup> .....	1919		35,812	2,023	12,352		
Vermont <sup>2</sup> .....	1919	4,555	7,930	365	16,971		
Virginia.....	1919	264	116,855	19,309	143,931		
	1914	417	147,841	1,629	82,432	(2)	
Washington.....	1919		163,504	2,162	111,132		
	1914	28	116,493	14,563	74,633	(2)	
West Virginia <sup>2</sup> .....	1919	822	3,685			2,471	
Wisconsin.....	1919		345,322	17,920	96,397	92	
	1914	425	242,174	12,870	41,559	(2)	
All other states.....	1919	76,541	29,012	1,897	362,341		
	1914	67,145	629,737	127,635	1,105,916	(2)	533,607

<sup>1</sup> Includes some semianthracite.<sup>2</sup> Included in figures for fuel oils.<sup>3</sup> Included with "All other states" in 1914.

## SPECIAL STATISTICS.

Establishments, by kind of gas manufactured.—The number of gas manufacturing establishments in opera-

tion in the United States in 1919 and 1914 is shown in Table 11, classified according to kind of gas produced.

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TABLE 11.—NUMBER OF ESTABLISHMENTS, BY KIND OF GAS, BY GEOGRAPHIC DIVISIONS AND STATES: 1919 AND 1914.

DIVISION AND STATE.	Cen-	Num-	CLASSIFIED BY KIND OF GAS.							DIVISION AND STATE.	Cen-	Num-	CLASSIFIED BY KIND OF GAS.						
			sus-	ber of	estab-	lish-	ments.	Carbureted water gas.	Coal gas.	Mixed coal and water gas.	Oil gas.	Acetylene.	Gasoline (cold process) gas.	Other gas (enriched natural).	Carbureted water gas.	Coal gas.	Mixed coal and water gas.	Oil gas.	Acetylene.
UNITED STATES...	1919	1,022	401	233	190	2	137	3	37	22	7								
	1914	1,284	430	277	147	4	153	5	165	112	7								
GEOGRAPHIC DIVISIONS:																			
New England.....	1919	112	50	18	34	7	2	1											
	1914	134	47	22	36	8	18	3											
Middle Atlantic.....	1919	220	129	28	28	13	17	5											
	1914	273	145	40	21	18	34	15											
East North Central...	1919	231	53	92	61	10	12	2	3										
	1914	266	62	103	42	8	33	18											
West North Central...	1919	161	97	21	19	8	3	14											
	1914	281	98	28	13	12	54	76											
South Atlantic.....	1919	108	48	27	20	10	3												
	1914	121	50	31	15	10	15												
East South Central...	1919	39	2	21	11	5													
	1914	47	5	28	7	5	2												
West South Central...	1919	32	14	4	5	9					1								
	1914	37	16	4	4	9	4												
Mountain.....	1919	39	5	12	8	15													
	1914	37	4	11	6	15	1												
Pacific.....	1919	80	3	10	4	60					3								
	1914	88	3	10	3	68	4												
NEW ENGLAND:																			
Maine.....	1919	13	3	6	2	1	1												
	1914	17	4	6	1	1	5												
New Hampshire.....	1919	13	7	2	1	2													
	1914	14	5	2	2	2	1	2											
Vermont.....	1919	9	7	1	1														
	1914	9	7	1	1	1													
Massachusetts.....	1919	51	17	9	21	3	1												
	1914	61	15	12	22	3	8	1											
Rhode Island.....	1919	4	1		3		1												
	1914	6	2		3														
Connecticut.....	1919	22	15	6	1	2	3												
	1914	27	14	1	7	2	3												
MIDDLE ATLANTIC:																			
New York.....	1919	96	46	17	15	3	11	4											
	1914	131	52	25	15	5	20	14											
New Jersey.....	1919	38	21	2	6	5	3	1											
	1914	43	24	5	2	6	5	1											
Pennsylvania.....	1919	86	62	9	7	5	3												
	1914	99	69	10	4	7	9												
EAST NORTH CENTRAL:																			
Ohio.....	1919	15	4	8	1	2													
	1914	25	7	9	2	3	4												
Indiana.....	1919	653	10	22	11	1	8												
	1914	60	11	20	10		19												
Illinois.....	1919	70	21	19	20	4	4	1	1										
	1914	75	25	20	14	3	8	5	1										
Michigan.....	1919	659	6	31	21	2													
	1914	59	6	39	12	1		1											
Wisconsin.....	1919	34	12	12	8	1													
	1914	47	13	15	4	1	2	12											
WEST NORTH CENTRAL:																			
Minnesota.....	1919	23	11	4	5	1		2											
	1914	47	8	7	2	3	10	17											
Iowa.....	1919	68	43	5	9	1	1	9											
	1914	113	43	9	7	1	10	43											
Missouri.....	1919	26	13	8	2	3	1												
	1914	35	14	8	1	3	9												
North Dakota.....	1919	5	2	2															
	1914	9	3	1	1		4												
South Dakota.....	1919	12	10		1	2	2	4											
	1914	17	7	1	1	2													

<sup>1</sup> Five establishments reported two kinds of gas made and sold separately.

<sup>2</sup> Includes 55 Tintsch gas plants distributed among 33 states.

<sup>3</sup> Distributing through mains only.

<sup>4</sup> Includes 61 Pintsch gas plants distributed among 31 states; and 4 blan gas plants located 1 each in Minnesota, Missouri, Nebraska, and New York.

<sup>5</sup> Includes 49 plants without distributing mains, selling compressed gas in containers, located as follows: Five in Missouri; 4 in Massachusetts; 4 in Texas; 3 in Georgia; 3 in New Jersey; 2 each in California, Illinois, Indiana, Iowa, Minnesota, New York, and Ohio; and 1 each in Maryland, Nebraska, Pennsylvania, Rhode Island, Tennessee, Washington, and Wisconsin.

<sup>6</sup> Reestablishment reported mixed coal and water gas and oil gas made and sold separately.

<sup>7</sup> Reestablishment reported coal gas and oil gas made and sold separately.

## MANUFACTURES.

During the five-year period the total number of plants decreased 20.4 per cent. In regard to this decrease certain contributing factors should be considered. One is the centralizing tendency by which establishments formerly manufacturing independently are acquired by public-service corporations and turned into distributing stations supplied from larger and more centrally situated plants, or find it to their advantage to cease manufacturing and to purchase gas from other establishments for distribution. In both these cases the plants concerned are not included in the census canvass. Another factor in the case of town and village gasoline gas and acetylene plants is the deterrent effect of the increasing use of electric current on the installation of gas plants capable of meeting a demand to which the production of gasoline gas and acetylene gas was no longer adequate.

Four states—Colorado, North Carolina, Oregon, and Wyoming—show an increase in the total number of gas plants in operation, while in 10 states the number remained the same as in 1914.

The following tabular statement shows the per cent of increase and decrease in the number of establishments and the quantity of gas produced, for each kind of gas:

KIND.	PER CENT OF INCREASE, <sup>1</sup> 1914 TO 1919.	
	Number of estab- lishments.	Quantity of gas produced.
Total gas.....	-20.4	51.5
Mixed coal and water gas.....	29.3	108.5
Carbureted water gas.....	-6.7	0.9
Oil gas.....	-10.5	-6.6
Coal gas.....	-15.9	-23.6
Acetylene (sold through mains).....	-70.4	-65.9
Gasoline (cold process) gas.....	-80.4	-88.7

<sup>1</sup> A minus sign (—) denotes decrease.

**Materials and products.**—The special schedule used in collecting data for the industry called for a detailed report of the quantity and cost of the materials and fuel consumed during the year and of the quantity and value of all products manufactured. These figures are brought together in Table 12, which shows the total for the United States of each important material and product, for the years 1919, 1914, 1909, and 1904. The table shows also the unit cost and value for the principal items based on the quantity and the cost or value of same.

TABLE 12.—DETAILED STATISTICS OF QUANTITY AND VALUE: 1919, 1914, 1909, AND 1904.

	1919	1914	1909	1904
<b>MATERIALS.</b>				
Total cost.....	\$157,550,882	\$76,779,288	\$52,427,844	\$41,193,951
Coal used for gas making:				
Anthracite—				
Gross tons.....	1,307,383			
Cost.....	\$11,326,268			
Average cost per ton.....	\$8.66	6,118,672	4,940,598	4,431,774
Bituminous—				
Net tons.....	1,6,193,527	\$20,872,517	\$16,304,832	\$14,607,485
Cost.....	\$32,412,349	\$3.41	\$3.30	\$3.30
Average cost per ton.....	\$5.23			

TABLE 12.—DETAILED STATISTICS OF QUANTITY AND VALUE: 1919, 1914, 1909, AND 1904—Continued.

	1919	1914	1909	1904
<b>MATERIALS—continued.</b>				
Coke (purchased) used for gas making:				
Net tons.....	1,335,322	964,851	591,919	435,534
Cost.....	\$11,781,932	\$4,500,289	\$2,667,706	\$1,002,782
Average cost per ton.....	\$8.82	\$4.66	\$4.51	\$3.68
Oil used for gas making:				
Gallons.....	163,652,910			
Cost.....	\$6,183,438			
Average cost per gallon.....	\$0.038	715,418,623	575,309,411	
Oil used for enriching gas:				
Gallons.....	718,020,458			
Cost.....	\$44,546,711			
Average cost per gallon.....	\$0.062			
Benzene or benzol:				
Gallons.....	14,155	388,146	253,837	410,989,564
Cost.....	\$2,107	\$54,053	\$27,543	\$15,015,602
Average cost per gallon.....	\$0.22	\$0.14	\$0.11	\$0.036
Benzine, gasoline, and naphtha:				
Gallons.....	111,923	998,353	1,093,874	
Cost.....	\$35,504	\$169,020	\$212,226	
Average cost per gallon.....	\$0.32	\$0.17	\$0.19	
Calcium carbide:				
Pounds.....	1,049,222	31,749,491	6,080,465	(2)
Cost.....	\$45,377	\$887,937	\$195,836	(2)
Average cost per pound.....	\$0.044	\$0.027	\$0.032	
Lime, cost.....		\$26,281	(2)	(2)
Oxide or purifying material, cost.....		\$1,075,748	(2)	(2)
Gas purchased (43 establish- ments):				
M cu. ft.....	67,105,518			
Cost.....	\$22,012,816			
Average cost per M cu. ft.....	\$0.34			
Coke oven (16 est.)—				
M cu. ft.....	23,995,064			
Cost.....	\$3,784,539			
Average cost per M cu. ft.....	\$0.16			
Coal (5 est.)—				
M cu. ft.....	15,041,980			
Cost.....	\$9,343,107			
Average cost per M cu. ft.....	\$0.62	28,351,074	16,769,705	2,896,571
Mixed coal and water (6 est.)—				
M cu. ft.....	31,748	\$8,883,016	\$5,416,601	\$937,252
Cost.....	\$31,524		\$0.31	\$0.35
Average cost per M cu. ft.....	\$0.99			
Carbureted water (10 est.)—				
M cu. ft.....	14,932,670			
Cost.....	\$7,476,894			
Average cost per M cu. ft.....	\$0.50			
Natural (8 est.)—				
M cu. ft.....	13,104,056			
Cost.....	\$1,876,752			
Average cost per M cu. ft.....	\$0.15			
Boiler fuel, cost.....		\$7,728,090	\$3,784,911	\$2,298,168
Refin'g and bench fuel, cost.....		\$854,754		
Water, cost.....		\$576,599	(2)	(2)
All other materials, cost.....		\$7,800,498	\$5,512,723	\$2,718,797
Amount paid for lamps and ap- pliances purchased for sale.....		\$10,546,900	\$7,393,224	\$5,537,936
<b>PRODUCTS.</b>				
Total value.....	\$329,278,903	\$220,237,790	\$166,814,371	\$125,144,945
<b>Gas:</b>				
For sale—				
M cu. ft.....	303,440,473	203,639,260	150,835,793	112,549,979
Value.....	\$282,288,778	\$175,065,920	\$138,815,309	\$112,652,588
Average value, M cu. ft.....	\$0.92	\$0.86	\$0.92	\$1.00
Plant consumption and loss,				
M cu. ft.....	35,679,338	1,121,108	1,730,563	1,363,757
Coal gas—				
M cu. ft.....	8,029,749	10,509,946	19,985,253	12,693,034
Value.....	\$10,496,613	\$10,726,514	\$18,085,841	\$12,884,604
Average value, M cu. ft.....	\$1.31	\$1.02	\$0.90	\$1.01
Carbureted water gas—				
M cu. ft.....	90,798,299	90,017,725	81,144,508	55,402,968
Value.....	\$83,663,451	\$74,516,534	\$70,802,780	\$48,903,620
Average value, M cu. ft.....	\$0.92	\$0.83	\$0.87	\$0.88
Mixed coal and water gas—				
M cu. ft.....	179,871,832	86,281,339	40,775,283	40,980,414
Value.....	\$161,199,670	\$72,012,021	\$36,953,543	\$45,605,263
Average value, M cu. ft.....	\$0.90	\$0.63	\$0.91	\$1.11
Oil gas—				
M cu. ft.....	15,421,836	16,512,274	8,688,860	3,441,352
Value.....	\$18,747,496	\$15,044,509	\$12,111,458	\$5,141,460
Average value, M cu. ft.....	\$1.22	\$0.91	\$1.39	\$1.49
Acetylene—				
Distributed through mains—				
M cu. ft.....	5,077	14,868		
Value.....	\$69,647	\$194,019		
Average value, M cu. ft.....	\$13.72	\$13.05		
Delivered in containers (compressed)—				
M cu. ft.....	121,696		25,186	7,881
Value.....	\$2,317,605		\$361,348	\$104,267
Average value, M cu. ft.....	\$19.04		\$14.35	\$13.33
Gasoline (cold process) gas—				
M cu. ft.....	20,428	181,412	216,648	24,330
Value.....	\$41,160	\$264,718	\$320,339	\$39,334
Average value, M cu. ft.....	\$2.02	\$1.40	\$1.48	\$1.62
Other gas (enriched natural) —				
M cu. ft.....	14,295,252			
Value.....	\$8,070,732			
Average value, M cu. ft.....	\$0.50			

(See foot notes at end of table.)

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TABLE 12.—DETAILED STATISTICS OF QUANTITY AND VALUE: 1919, 1914, 1909, AND 1904—Continued.

	1919	1914	1909	1904
<b>PRODUCTS—continued.</b>				
Coke:				
Production, net tons.....	4,278,533	3,582,565	2,631,997	2,714,152
For sale—				
Net tons.....	2,458,166	2,281,835	1,640,994	1,782,929
Value.....	\$17,822,894	\$8,710,920	\$5,723,215	\$5,195,461
Average value, ton.....	\$7.25	\$3.80	\$3.50	\$3.00
Made and consumed, net tons.....	1,820,367	1,300,730	991,003	931,223
Used in gas generators.....	663,205			
For retort and bench fuel.....	730,315			
For retort and bench fuel.....	426,787			
Used otherwise.....				
Tar:				
Coal-gas tar—				
Production, gallons.....	65,824,282			
For sale—				
Gallons.....	61,969,577			
Value.....	\$2,647,813			
Made and consumed, gallons.....	3,854,705	153,311,196	109,930,058	82,288,299
Water-gas and oil-gas tar—		125,938,607	78,339,380	67,513,421
Production, gallons.....	105,318,339	\$3,252,765	\$1,875,549	\$2,064,343
For sale—				
Gallons.....	58,557,947			
Value.....	\$2,012,723			
Made and consumed, gallons.....	46,760,392			
Ammonia:				
Ammonia liquors—				
Gallons.....	23,393,329			
Value.....	\$1,674,449			
Anhydrous ammonia—				
Pounds.....	1,846,024	50,737,762	37,277,864	
Value.....	\$150,590	\$1,235,442	\$725,702	
Ammonium sulphate—				
Pounds.....	5,073,945	6,216,618	(2)	
Value.....	\$205,101	\$134,190	(2)	
Hydrocarbons:				
Gallons.....	491,559	(2)	(2)	
Value.....	\$46,910	\$35,902	\$14,509	
Light oil and derivatives:				
Crude light oil—				
Production, gallons.....	6,491,113			
For sale—				
Gallons.....	285,071			
Value.....	\$34,369			
Made and consumed, gallons.....	6,206,042			
Secondary light oil—				
Gallons.....	662,897			
Value.....	\$45,841			
Benzol—				
Crude, gallons.....	3,738,844			
For sale—				
Gallons.....	76,816			
Value.....	\$14,974			
Made and consumed, gallons.....	3,062,028			
Refined (pure)—				
Gallons.....	3,147,751			
Value.....	\$501,732			
Toluol—				
Crude, gallons.....	214,270			
For sale—				
Gallons.....	4,146			
Value.....	\$1,623			
Made and consumed, gallons.....	210,124			
Refined (pure)—				
Gallons.....	165,612			
Value.....	\$94,247			
Solvent naphtha—				
Gallons.....	187,034			
Value.....	\$43,689			
Other refined oils—				
Gallons.....	567,252			
Value.....	\$88,959			
Drip and holder oil—				
Gallons.....	2,659,080			
Value.....	\$137,957			
Naphthalene:				
Crude—				
Production, pounds.....	1,757,317			
For sale—				
Pounds.....	521,450			
Value.....	\$6,811			
Made and consumed, pounds.....	1,235,858			
Refined—				
Pounds.....	911,710			
Value.....	\$45,585			
Pitch:				
Production, pounds.....	13,966,731			
For sale—				
Pounds.....	13,834,551			
Value.....	\$92,988			
Made and consumed, pounds.....	132,180			
Retort carbon:				
Production, pounds.....	12,145,336			
For sale—				
Pounds.....	1,136,575			
Value.....	\$9,370			
Made and consumed, pounds.....	11,008,761			
Lamphack (gas-house):				
Production, pounds.....	207,944,060			
For sale—				
Pounds.....	34,239,800			
Value.....	\$107,201			
Made and consumed, pounds.....	173,704,260			

TABLE 12.—DETAILED STATISTICS OF QUANTITY AND VALUE: 1919, 1914, 1909, AND 1904—Continued.

	1919	1914	1909	1904
<b>PRODUCTS—continued.</b>				
Other by-products, value.....	\$697,494			
Gas lime, value.....	\$205			
Spent oxide, value.....	\$32,358			
All other products, value.....	\$3,055,869			
Receipts from rents and sales of lamps and appliances:				
Rents.....	\$1,763,187			
Sales.....	\$15,595,155	\$10,977,774	\$7,043,390	\$1,249,581
<sup>1</sup> Includes 956 tons of cannel coal, valued at \$3,818.				
<sup>2</sup> Figures not available.				
<sup>3</sup> In addition, the following products of gas manufacture were produced commercially by 5 establishments in 1919 and 6 in 1914, engaged primarily in other lines of manufacture:				
	1919		1914	
	Quantity.	Value.	Quantity.	Value.
Total value.....		\$121,761		\$158,743
Gas.....	64,199	112,480	56,939	131,979
Coal.....	17,576	29,158	41,744	45,394
Carbureted water.....	36,325	60,717	10,154	16,011
Oil.....	10,298	16,605	-----	-----
Acetylene (compressed).....	(6)	(6)	5,011	70,574
Coke, net tons.....	913	6,017	2,287	9,356
Tar, gallons.....	23,200	1,635	35,100	2,076
Receipts from lamps and appliances.....		1,629		15,332
<sup>4</sup> Includes for 1909, 1,726,082 M cu. ft. of straight water gas, valued at \$1,289,031; and for 1914, 715,550 M cu. ft., valued at \$432,440.				
<sup>5</sup> Included in chemicals in 1919 census; 311,390 M cu. ft., value \$7,140,757, reported by 50 establishments.				
<sup>6</sup> Enriched natural gas not reported prior to 1919.				
<sup>7</sup> In addition, 13,813,058 gallons were produced for which no value was reported.				
Fuel used for power purposes and for heating retorts is not included with materials used in gas making, and its cost is shown separately. Quantity and cost are shown for each kind of gas purchased as a material, and the number of establishments purchasing each kind.				
Though the increase in the quantity of materials used has been fairly uniform during the three five-year periods covered, a great difference is apparent in the cost in 1919 as compared with that in 1914. While the quantity of coal used increased 22.6 per cent, that of purchased coke 38.4 per cent, and that of oil 23.2 per cent, the total cost of coal increased 109.6 per cent, that of coke 161.8 per cent, and that of oil 105.2 per cent.				
The difference between the cost per gallon of oil for gas making, 3.8 cents, and of that for enriching gas, 6.2 cents, is to be explained by the fact that four-fifths of the oil gas in the United States was made in California, where the transportation cost is relatively low, while much of the oil used for enriching carbureted water gas was consumed by plants situated far from the source of supply.				
The purchase of gas for mixing has increased greatly since the previous census. In keeping with the relative and actual increase in the sale of mixed coal and water gas, the larger part of the gas purchased as a material was coal gas and coke-oven gas bought by plants manufacturing carbureted water gas, and carbureted water gas bought by plants manufacturing coal gas, for the purpose of mixing. Natural gas, the use of which as an ingredient in mixed gas has not appeared at any previous census, formed about one-fifth of the purchased gas.				

## MANUFACTURES.

The decrease in calcium carbide is due in part to the transfer to the chemical industry of establishments selling acetylene in containers.

The total value of the products of the gas industry in 1919 was 49.5 per cent greater than in 1914, while the value of gas alone was 61.2 per cent greater. The average unit value of all gas, which had dropped to 86 cents per M cubic feet in 1914, rose in 1919 to approximately 92 cents, which was also the average value in 1909.

The total quantity of gas produced for sale was 51.5 per cent more in 1919 than in 1914. About nine-tenths of this increase was in mixed coal and water gas, which represented 58.3 per cent of the total. The production of coal gas decreased 23.6 per cent, while that of oil gas was 6.6 per cent less in 1919 than in 1914.

In regard to the quantity of gas produced for sale it must be borne in mind that of the gas reported as purchased, under "Materials," 30,006,398 M cubic feet was the product of gas-manufacturing plants. As this was an ingredient in the gas sold by the purchasing establishments it entails a duplication in the total.

The average selling value of coke increased over 90 per cent, that of tar over 50 per cent, and that of ammonia liquors over 200 per cent, during the period from 1914 to 1919. The greater part of the coal-gas tar produced was sold, while nearly half of the water-gas and oil-gas tar was consumed in the producing plants, chiefly as fuel. A small proportion of the establishments broke up coal-gas tar for the segregation of the derivatives, some of which were sold in their crude form and some refined. Nearly all the crude benzol and toluol produced was refined in the producing plants, while over a third of the naphthalene was sold in the crude form.

**By-products, gas and coking industries.**—In this connection Table 13 is introduced to show the gas and other by-products of the coking industry—the by-products of retort coke ovens—in 1919 and 1914, as reported by the Geological Survey.

These by-products—tar, the ammonia products, benzol, toluol, solvent naphtha, naphthalene, etc.—are to be considered in conjunction with the output reported by the gas industry and are assembled in Table 14.

TABLE 13.—COKE-OVEN BY-PRODUCTS: 1919 AND 1914.  
[Geological Survey.]

PRODUCT.	Production.	1919		1914	
		Sales.		Quantity.	Value.
		Quantity.	Value.		
Total.....		\$63,696,508			
Gas.....	M. cu. ft.	415,642,265	193,073,979	16,685,007	61,361,375 \$6,093,583
Tar.....	galls.	288,898,784	217,980,143	6,919,265	103,901,315 2,867,274
Ammonia:					
Sulphate.....	lbs.	544,231,085	557,619,631	21,075,718	170,763,906 4,696,590
Liquor.....	galls.	(-)	(-)	(-)	5,938,233 658,497
Anhydrous or free ammonia <sup>3</sup> .....	lbs.	50,535,639	51,646,744	5,692,950	25,370,509 2,300,137
Benzol products:					
Crude light oil.....	galls.	92,356,750			
Benzol (crude).....	galls.	44,069,970	44,697,015	7,776,669	
Benzol (refined).....	galls.	17,008,532	18,403,909	3,783,552	
Toluol (crude).....	galls.	1,160,136	1,353,827	355,990	
Solvent naphtha.....	galls.	3,915,489	3,625,978	552,853	
Other refined oils.....	galls.	575,885	127,483	18,353	
Naphthalene (crude).....	lbs.	3,549,998	4,038,455	82,244	
Naphthalene (refined).....	lbs.	2,763,271	2,663,585	109,120	
Other by-products <sup>4</sup> .....				645,142	

<sup>1</sup> Exclusive of coke breeze, production of which amounted to 1,839,291 short tons, valued at \$2,442,511.

<sup>2</sup> Included in figures for Anhydrous or free ammonia.

<sup>3</sup> Includes liquor and sulphate sold on pound basis of NH<sub>3</sub>.

<sup>4</sup> Figures not available.

TABLE 14.—GAS AND COKE-OVEN BY-PRODUCTS: 1919.

		Combined production.	The gas industry.	By-product coke industry.
Tar (coal-gas tar).....	gallons.	354,723,046	65,824,282	288,898,784
Ammonia:				
Sulphate.....	pounds.	549,305,930	5,073,945	544,231,985
Anhydrous or free ammonia.....	pounds.	52,381,663	1,846,024	50,535,639
Liquor.....	gallons.	23,393,320	23,393,320	( <sup>2</sup> )
Crude light oil.....	gallons.	98,847,868	6,491,113	92,356,750
Benzol:				
Crude.....	gallons.	47,790,814	3,738,849	44,069,970
Refined.....	gallons.	20,154,283	3,147,751	17,008,532
Toluol:				
Crude.....	gallons.	214,270	214,270	
Refined.....	gallons.	1,325,748	165,612	1,160,136
Solvent naphtha.....	gallons.	4,102,523	187,034	3,915,489
Other refined oils.....	gallons.	1,143,137	567,252	575,885
Naphthalene:				
Crude.....	pounds.	5,307,315	1,757,317	3,549,998
Refined.....	pounds.	3,674,981	911,710	2,763,271

<sup>1</sup> Includes liquor and sulphate sold on pound basis of NH<sub>3</sub>.

<sup>2</sup> Included in figures for anhydrous or free ammonia.

**Materials, by states.**—Table 15 shows, by states, the quantity and cost of the principal purchased materials used by gas-manufacturing establishments during 1919 and the quantity of materials which were produced in the plants where consumed.

# MANUFACTURED GAS.

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TABLE 15.—PRINCIPAL MATERIALS, BY STATES: 1919.

	Quantity.	Cost.
PURCHASED MATERIALS.		
Coal, anthracite, for gas making.....	Gross tons. 1,307,393	\$11,326,268
Connecticut.....	38,633	\$375,708
Delaware.....	15,123	114,298
Illinois.....	77,309	820,813
Maine.....	3,289	38,453
Maryland.....	91,663	828,482
Massachusetts.....	62,090	569,695
New Hampshire.....	5,384	63,277
New Jersey.....	134,288	1,124,776
New York.....	668,654	5,573,154
Pennsylvania.....	132,900	1,052,819
Rhode Island.....	4,532	45,728
Vermont.....	5,002	49,956
All other states.....	73,415	669,109
Net tons. 6,192,561		\$32,403,531
Coal, bituminous, for gas making.....		
Alabama.....	82,621	421,132
Colorado.....	133,232	642,715
Connecticut.....	186,648	1,203,236
Delaware.....	895	7,274
Georgia.....	92,704	481,341
Idaho.....	8,905	58,957
Illinois.....	325,322	1,795,927
Indiana.....	776,705	3,080,368
Iowa.....	64,860	432,202
Kansas.....	6,265	42,377
Kentucky.....	14,832	79,824
Maine.....	48,472	374,085
Maryland.....	11,507	66,085
Massachusetts.....	561,461	3,970,104
Michigan.....	746,648	3,846,952
Minnesota.....	82,602	637,116
Mississippi.....	22,853	140,844
Missouri.....	631,390	1,307,170
Montana.....	14,090	97,611
New Hampshire.....	15,056	120,694
New Jersey.....	26,463	141,164
New York.....	881,421	4,571,270
North Carolina.....	55,026	321,553
Ohio.....	37,709	174,646
Oregon.....	4,492	31,047
Pennsylvania.....	371,545	1,923,934
Rhode Island.....	177,056	1,292,180
South Dakota.....	1,366	11,037
Tennessee.....	83,388	400,309
Texas.....	18,484	133,907
Utah.....	34,356	170,029
Vermont.....	8,048	51,312
Virginia.....	103,428	559,245
Washington.....	149,471	890,387
Wisconsin.....	318,228	1,778,954
All other states.....	64,916	541,506
Cocal, cannel, for gas making.....		966
Coke, purchased, for gas making.....		1,335,322
Connecticut.....	7,791	65,388
Florida.....	12,457	170,346
Georgia.....	8,647	90,549
Illinois.....	486,049	4,507,997
Indiana.....	38,088	383,573
Iowa.....	64,339	723,323
Massachusetts.....	101,933	907,394
Michigan.....	3,164	32,561
Minnesota.....	15,055	142,200
Missouri.....	23,125	247,743
Nebraska.....	28,750	369,103
New Hampshire.....	8,361	77,128
New Jersey.....	94,245	643,687
New York.....	127,148	784,518
North Carolina.....	4,041	30,388
Ohio.....	2,511	23,241
Pennsylvania.....	176,607	1,139,769
South Carolina.....	9,505	101,357
South Dakota.....	7,852	104,238
Texas.....	41,696	459,869
Virginia.....	13,768	119,755
Wisconsin.....	12,128	123,908
All other states.....	47,562	524,809
Oil for gas making.....	Gallons. 163,652,910	\$6,183,438
Arizona.....	3,950,846	219,619
California.....	120,520,238	4,912,499
Illinois.....	729,524	45,178
Massachusetts.....	633,663	53,763
Missouri.....	184,101	12,076
New Jersey.....	853,965	60,736
New York.....	342,943	20,626
Oregon.....	24,636,931	464,228
Pennsylvania.....	696,603	57,212
Tennessee.....	255,433	18,971
Texas.....	845,273	35,940
All other states.....	4,003,390	282,601

TABLE 15.—PRINCIPAL MATERIALS, BY STATES: 1919—Contd.

	Quantity.	Cost.
PURCHASED MATERIALS—continued.		
Oil for enriching gas.....	Gallons. 718,020,459	\$44,546,711
Alabama.....	2,483,904	198,255
Colorado.....	1,955,355	145,282
Connecticut.....	14,054,015	1,050,201
Delaware.....	3,035,093	216,706
Florida.....	2,217,585	203,665
Georgia.....	5,441,222	457,985
Illinois.....	102,532,320	6,217,016
Indiana.....	9,088,528	631,557
Iowa.....	12,316,948	842,005
Kansas.....	234,905	12,317
Maine.....	904,825	74,451
Maryland.....	19,765,783	1,167,619
Massachusetts.....	39,588,508	2,661,958
Michigan.....	20,534,211	1,388,636
Minnesota.....	10,110,314	739,572
Missouri.....	9,874,667	601,893
Montana.....	335,510	26,430
Nebraska.....	6,552,526	447,445
New Hampshire.....	2,194,952	169,671
New Jersey.....	59,299,708	2,419,022
New York.....	259,058,705	17,117,110
North Carolina.....	1,137,090	96,423
Ohio.....	523,353	36,108
Pennsylvania.....	76,937,061	3,897,603
Rhode Island.....	6,006,966	412,420
South Carolina.....	2,130,619	167,694
South Dakota.....	1,201,358	94,027
Tennessee.....	2,600,904	181,189
Texas.....	13,798,425	464,739
Vermont.....	835,966	64,708
Virginia.....	7,125,049	529,405
Washington.....	5,623,586	336,533
Wisconsin.....	4,069,942	351,752
All other states.....	25,339,537	1,617,277
Benzene or benzol for gas making.....		14,155
Benzine, gasoline, and naphtha.....		111,923
Iowa.....	39,050	14,009
New York.....	20,841	5,109
All other states.....	52,032	16,296
Calcium carbide.....	Pounds. 1,049,222	\$45,977
Illinois.....	74,700	3,477
Indiana.....	176,640	6,320
New Jersey.....	156,000	4,867
New York.....	275,367	18,127
Pennsylvania.....	74,100	2,555
All other states.....	292,415	12,622
Oxide or purifying material.....		\$1,075,748
Alabama.....		3,078
Arizona.....		9,573
California.....		50,580
Colorado.....		1,761
Connecticut.....		36,017
Delaware.....		10,111
Florida.....		6,638
Georgia.....		2,370
Illinois.....		137,577
Indiana.....		27,390
Iowa.....		14,543
Kansas.....		1,024
Kentucky.....		1,944
Maine.....		2,570
Maryland.....		25,316
Massachusetts.....		81,440
Michigan.....		81,285
Minnesota.....		32,252
Mississippi.....		1,427
Missouri.....		39,854
Montana.....		4,114
Nebraska.....		6,043
New Hampshire.....		2,492
New Jersey.....		57,084
New York.....		203,481
North Carolina.....		2,032
North Dakota.....		313
Ohio.....		3,836
Oregon.....		18,081
Pennsylvania.....		114,648
Rhode Island.....		10,628
South Carolina.....		1,235
South Dakota.....		1,977
Tennessee.....		5,621
Texas.....		14,091
Utah.....		4,394
Virginia.....		11,952
Washington.....		2,813
Wisconsin.....		24,632
All other states.....		17,057

## MANUFACTURES.

TABLE 15.—PRINCIPAL MATERIALS BY STATES: 1919—Contd.

	Quantity.	Cost.
PURCHASED MATERIALS—continued.		
Gas purchased.....	M cu. ft. 67,105,518	22,612,816
California.....	12,312,002	1,773,440
Illinois.....	6,104,903	1,206,773
Indiana.....	1,198,137	216,164
Massachusetts.....	2,126,472	675,698
New Jersey.....	6,339,273	1,442,076
New York.....	13,054,951	8,774,408
Pennsylvania.....	14,150,700	6,802,314
All other states.....	11,819,080	1,721,943
MATERIALS PRODUCED AND CONSUMED IN SAME ESTABLISHMENT.	Net tons. 1,820,367	.....
Coke.....	663,295	.....
Used in gas generators.....	730,315	.....
For retort or bench fuel.....	426,787	.....
Alabama.....	37,775	.....
Colorado.....	38,175	.....
Connecticut.....	87,473	.....
Georgia.....	49,308	.....
Idaho.....	2,429	.....
Illinois.....	67,981	.....
Indiana.....	91,735	.....
Iowa.....	16,692	.....
Kansas.....	1,952	.....
Kentucky.....	3,691	.....
Maine.....	13,599	.....
Maryland.....	8,375	.....
Massachusetts.....	233,117	.....
Michigan.....	269,357	.....
Minnesota.....	42,221	.....
Mississippi.....	5,218	.....
Missouri.....	82,237	.....
Montana.....	5,004	.....
New Hampshire.....	3,442	.....
New Jersey.....	11,721	.....
New York.....	368,773	.....
North Carolina.....	15,511	.....
Ohio.....	8,456	.....
Oregon.....	1,236	.....
Pennsylvania.....	46,108	.....
Rhode Island.....	39,698	.....
Tennessee.....	32,374	.....
Texas.....	9,060	.....
Utah.....	15,295	.....
Virginia.....	51,770	.....
Washington.....	71,076	.....
Wisconsin.....	78,951	.....
All other states.....	21,539	.....
Coal-gas tar.....	Gallons. 3,854,705	.....
Connecticut.....	889,557	.....
Georgia.....	654,727	.....
Indiana.....	121,905	.....
Massachusetts.....	660,767	.....
Michigan.....	125,298	.....
Montana.....	126,436	.....
New Jersey.....	523,667	.....
New York.....	222,492	.....
Rhode Island.....	157,443	.....
Virginia.....	127,378	.....
All other states.....	245,035	.....
Water-gas and oil-gas tar.....	46,760,392	.....
California.....	882,835	.....
Colorado.....	195,520	.....
Connecticut.....	1,140,030	.....
Georgia.....	341,123	.....
Illinois.....	1,219,126	.....
Massachusetts.....	4,081,272	.....
Missouri.....	138,563	.....
Nebraska.....	618,351	.....
New Jersey.....	733,527	.....
New York.....	31,778,968	.....
Pennsylvania.....	1,061,239	.....
Rhode Island.....	484,548	.....
Tennessee.....	225,832	.....
Texas.....	832,343	.....
All other states.....	3,026,815	.....
Gas used on premises.....	M cu. ft. 7,491,158	.....
Indiana.....	3,968,967	.....
Missouri.....	2,023,272	.....
New York.....	230,144	.....
Rhode Island.....	474,974	.....
All other states.....	793,801	.....

Owing to the increase in the unit costs of the various materials, as shown in Table 12, the difference between the material costs in 1914 and 1919 bears

no definite relation to the actual growth of the industry. Any comparison, therefore, between consumption of materials and other aspects of the industry must be based on quantities.

New York was the heaviest user of coal for gas making, consuming 51 per cent of the anthracite and 14 per cent of the bituminous. Illinois led in the consumption of purchased coke, using 36 per cent of the total. California consumed 77 per cent of the oil used for gas making, while 36 per cent of the oil used for enriching gas was consumed in New York. Of all coke produced, 43 per cent was consumed in the producing plants, and the amount of this coke made and consumed was 36 per cent greater than that of coke purchased.

Products, by states.—Table 16 shows, by principal states, the quantity and value of the chief products in 1919.

TABLE 16.—PRODUCTS, BY STATES: 1919.

PRODUCT AND STATE.	Quantity.	Value.
GAS, TOTAL (FOR SALE).....	M cu. ft. 303,440,473	\$282,288,778
Alabama.....	1,212,748	1,353,028
Arizona.....	350,729	651,307
California.....	25,145,377	19,885,050
Colorado.....	2,005,498	2,020,345
Connecticut.....	6,133,333	7,052,752
Delaware.....	773,368	933,757
Florida.....	996,777	1,477,058
Georgia.....	2,097,916	2,665,166
Idaho.....	89,364	196,190
Illinois.....	36,520,788	32,446,256
Indiana.....	8,195,804	6,761,639
Iowa.....	4,047,690	4,982,122
Kansas.....	140,026	345,713
Kentucky.....	175,841	278,131
Maine.....	680,716	1,045,533
Maryland.....	7,252,886	5,463,505
Massachusetts.....	20,177,864	21,500,458
Michigan.....	16,603,149	14,150,239
Minnesota.....	5,195,651	4,988,929
Mississippi.....	226,624	314,628
Missouri.....	7,648,192	6,830,202
Montana.....	235,339	394,872
Nebraska.....	1,644,175	2,137,335
New Hampshire.....	780,868	1,071,250
New Jersey.....	18,343,949	18,626,771
New York.....	76,730,459	62,362,211
North Carolina.....	765,736	1,135,703
North Dakota.....	147,754	293,532
Ohio.....	660,726	748,278
Oregon.....	2,556,215	2,329,500
Pennsylvania.....	33,662,922	28,113,111
Rhode Island.....	2,879,860	3,504,749
South Carolina.....	612,981	821,262
South Dakota.....	330,886	544,532
Tennessee.....	1,382,589	1,478,701
Texas.....	2,745,958	3,411,326
Utah.....	528,608	650,450
Vermont.....	279,076	427,440
Virginia.....	2,595,339	2,034,745
Washington.....	2,450,219	3,053,903
Wisconsin.....	7,285,943	6,282,033
All other states.....	6,184,557	6,611,435
Mixed coal and water gas.....	179,871,832	161,199,670
Alabama.....	1,106,684	1,164,455
Colorado.....	1,826,270	1,746,915
Connecticut.....	4,018,912	4,500,532
Georgia.....	1,445,957	1,714,872
Illinois.....	31,209,551	27,591,140
Indiana.....	5,183,339	3,866,123
Iowa.....	1,338,528	1,514,241
Massachusetts.....	18,132,994	18,812,440
Michigan.....	15,509,168	12,627,207
Minnesota.....	4,853,155	4,473,345
New Jersey.....	12,506,763	12,220,623
New York.....	37,321,574	28,441,162
North Carolina.....	356,203	516,432
Pennsylvania.....	15,153,512	15,028,601
Rhode Island.....	2,851,253	3,462,115
Tennessee.....	1,342,412	1,323,285
Texas.....	481,429	335,350
Virginia.....	2,290,365	2,529,169
Washington.....	2,227,705	2,671,172
Wisconsin.....	5,409,849	4,149,988
All other states.....	15,216,201	12,210,759

# MANUFACTURED GAS.

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TABLE 16.—PRODUCTS, BY STATES: 1919—Continued.

PRODUCT AND STATE.	Quantity.	Value.
GAS, TOTAL (FOR SALE)—Continued.		
Carburated water gas.....	<i>M cu. ft.</i> 90,796,299	83,663,451
Colorado.....	96,880	119,471
Connecticut.....	2,100,212	2,501,020
Delaware.....	770,480	928,977
Florida.....	604,991	908,214
Georgia.....	528,562	681,766
Illinois.....	4,131,266	3,420,406
Indiana.....	1,382,973	1,342,952
Iowa.....	2,560,171	3,112,977
Maine.....	157,581	250,510
Maryland.....	175,253	277,959
Massachusetts.....	1,460,963	1,823,317
Michigan.....	121,441	161,861
Minnesota.....	162,883	2,3,807
Missouri.....	1,181,112	1,633,390
Nebraska.....	1,620,330	2,092,217
New Hampshire.....	583,715	759,286
New Jersey.....	5,667,034	5,991,646
New York.....	38,917,795	33,990,884
North Carolina.....	154,218	250,140
Ohio.....	69,919	103,814
Pennsylvania.....	18,345,603	12,656,636
South Carolina.....	501,348	619,143
South Dakota.....	323,635	527,885
Texas.....	1,948,768	2,251,837
Vermont.....	208,311	311,762
Virginia.....	113,515	135,935
Wisconsin.....	646,697	793,472
All other states.....	6,262,528	6,610,103
Oil gas.....	15,421,836	18,747,496
Arizona.....	336,803	596,683
California.....	12,023,777	12,877,573
Illinois.....	43,390	267,875
Massachusetts.....	40,378	151,116
Missouri.....	26,388	190,380
New Jersey.....	48,717	244,297
New York.....	22,805	75,279
Oregon.....	2,481,915	2,205,074
Pennsylvania.....	37,021	241,211
Tennessee.....	13,737	116,851
Texas.....	76,472	254,901
All other states.....	270,433	1,526,256
Coal gas.....	8,029,749	10,496,613
Alabama.....	103,445	166,047
Colorado.....	76,742	106,199
Georgia.....	112,889	188,547
Idaho.....	85,473	164,161
Illinois.....	525,819	692,026
Indiana.....	1,175,189	1,127,695
Iowa.....	127,191	199,314
Kentucky.....	123,729	161,636
Maine.....	102,026	200,411
Maryland.....	88,607	144,517
Massachusetts.....	543,480	712,932
Michigan.....	950,328	1,252,092
Minnesota.....	172,447	230,176
Mississippi.....	185,887	259,180
Missouri.....	187,246	255,971
New York.....	404,290	711,860
North Carolina.....	252,926	378,807
Ohio.....	292,283	351,033
Oregon.....	42,208	77,867
Pennsylvania.....	126,338	186,559
Virginia.....	183,411	199,914
Washington.....	157,018	233,096
Wisconsin.....	1,177,122	1,267,032
All other states.....	761,495	1,194,281
Enriched natural gas.....	14,295,252	8,070,732
California.....	13,120,640	7,003,595
All other states.....	1,174,612	1,067,137
Acetylene, distributed through mains.....	5,077	69,647
Illinois.....	819	7,221
Indiana.....	778	10,053
New Jersey.....	244	6,619
New York.....	2,207	27,040
Pennsylvania.....	358	2,774
All other states.....	1,081	13,940
Gasoline (cold process) gas.....	20,428	41,169
Iowa.....	9,447	18,184
New York.....	1,608	3,985
All other states.....	5,283	18,999
COKE (FOR SALE).....	<i>Net tons.</i> 2,458,166	17,822,894
Alabama.....	13,869	116,364
Colorado.....	56,526	259,933
Connecticut.....	43,678	553,281
Georgia.....	14,803	91,044
Idaho.....	3,803	25,780
Illinois.....	123,631	895,064

TABLE 16.—PRODUCTS, BY STATES: 1919—Continued.

PRODUCT AND STATE.	Quantity.	Value.
COKE (FOR SALE)—Continued.		
Indiana.....	<i>M cu. ft.</i> 493,744	3,886,995
Iowa.....	22,347	224,082
Kansas.....	1,948	19,011
Kentucky.....	4,773	32,261
Maine.....	15,349	143,693
Maryland.....	3,155	17,156
Massachusetts.....	149,252	917,228
Michigan.....	238,411	1,997,534
Minnesota.....	12,628	97,117
Mississippi.....	9,434	52,853
Missouri.....	401,227	2,560,789
Montana.....	4,112	37,015
New Hampshire.....	6,982	58,770
New Jersey.....	5,677	36,823
New York.....	240,026	1,449,765
North Carolina.....	23,583	157,467
Ohio.....	13,607	82,766
Oregon.....	1,763	12,963
Pennsylvania.....	202,953	1,293,785
Rhode Island.....	86,181	678,477
Tennessee.....	23,820	143,322
Texas.....	1,506	11,946
Utah.....	7,238	42,904
Virginia.....	1,426	63,930
Washington.....	35,220	243,353
Wisconsin.....	138,948	1,161,199
All other states.....	48,476	429,203
COAL-GAS TAR (FOR SALE).....	<i>Gallons.</i> 61,969,577	2,647,813
Alabama.....	726,295	24,252
Colorado.....	1,556,207	88,058
Connecticut.....	1,574,315	103,295
Georgia.....	401,216	16,764
Idaho.....	85,938	3,861
Illinois.....	3,250,659	135,443
Indiana.....	5,797,675	266,939
Iowa.....	641,738	27,758
Kansas.....	89,201	4,189
Kentucky.....	135,018	7,905
Maine.....	521,872	20,109
Maryland.....	106,001	4,793
Massachusetts.....	6,010,657	282,296
Michigan.....	8,290,451	201,739
Minnesota.....	1,161,648	52,557
Mississippi.....	202,060	13,354
Missouri.....	5,343,911	215,292
Montana.....	10,300	1,012
New Hampshire.....	188,500	7,669
New Jersey.....	729,533	22,018
New York.....	10,790,125	489,489
North Carolina.....	441,899	16,848
Ohio.....	421,061	19,142
Oregon.....	37,896	3,020
Pennsylvania.....	3,946,159	157,136
Rhode Island.....	1,752,150	60,278
Tennessee.....	673,357	23,139
Texas.....	188,567	12,129
Utah.....	377,446	15,439
Virginia.....	724,855	25,654
Washington.....	1,360,512	74,760
Wisconsin.....	3,538,452	127,404
All other states.....	891,825	33,512
WATER-GAS AND OIL-GAS TAR (FOR SALE).....	58,557,947	2,012,723
Alabama.....	522,426	17,406
Arizona.....	2,923	288
California.....	239,780	2,847
Colorado.....	91,321	4,214
Connecticut.....	423,614	16,527
Florida.....	169,794	6,896
Georgia.....	159,160	5,804
Illinois.....	16,200,505	421,960
Indiana.....	993,478	23,329
Iowa.....	1,269,725	53,877
Maryland.....	3,162,174	169,210
Massachusetts.....	1,953,136	99,755
Michigan.....	1,496,795	40,945
Minnesota.....	1,573,566	77,537
Missouri.....	828,809	38,308
Montana.....	38,697	5,136
Nebraska.....	137,586	9,671
New Hampshire.....	29,129	686
New Jersey.....	5,965,498	185,979
New York.....	8,401,644	455,756
North Carolina.....	26,765	579
Ohio.....	51,945	1,854
Oregon.....	720,042	2,627
Pennsylvania.....	9,201,555	214,034
Rhode Island.....	25,417	2,110
South Carolina.....	175,660	8,382
South Dakota.....	7,937	491
Tennessee.....	22,175	894
Texas.....	210,429	8,121
Virginia.....	709,890	23,555
Washington.....	1,067,587	43,675
Wisconsin.....	692,547	20,552
All other states.....	1,866,205	49,385

## MANUFACTURES.

TABLE 16.—PRODUCTS BY STATES: 1919—Continued.

PRODUCT AND STATE.	Quantity.	Value.
	Mcu.ft.	
RECEIPTS FROM RENTS AND SALES OF LAMPS AND APPLIANCES.....	17,358,342	
		120,882
Alabama.....	32,217	
Arizona.....	265,507	
California.....	68,030	
Colorado.....	404,651	
Connecticut.....	107,831	
Delaware.....	242,898	
Florida.....	152,174	
Georgia.....	14,871	
Idaho.....	2,480,501	
Illinois.....	438,370	
Indiana.....	403,572	
Iowa.....	30,111	
Kansas.....	20,019	
Kentucky.....	140,398	
Maine.....	783,734	
Maryland.....	1,052,150	
Massachusetts.....	1,258,047	
Michigan.....	289,910	
Minnesota.....	29,557	
Mississippi.....	401,931	
Missouri.....	38,591	
Montana.....	253,246	
Nebraska.....	40,515	
New Hampshire.....	1,425,887	
New Jersey.....	3,580,695	
New York.....	148,053	
North Carolina.....	5,703	
North Dakota.....	24,346	
Ohio.....	196,234	
Oregon.....	914,125	
Pennsylvania.....	146,875	
Rhode Island.....	73,261	
South Carolina.....	67,421	
South Dakota.....	144,291	
Tennessee.....	153,181	
Texas.....	70,404	
Utah.....	24,888	
Vermont.....	70,819	
Virginia.....	171,688	
Washington.....	511,326	
Wisconsin.....	526,092	
All other states.....		

Of all gas manufactured for sale, 25 per cent by quantity and 22 per cent by value was produced in New York, which also ranked first in the production of carbureted water gas and mixed coal and water gas. Indiana and Wisconsin each reported nearly 15 per cent of the total production of coal gas. California and Oregon together produced 94 per cent of the oil gas, and 45 per cent of the acetylene sold through mains was in New York.

Table 17 shows, for the total gas production and for each kind, the number of establishments and the quantity produced for sale in 1919 and 1914, for the principal states arranged according to production in 1919.

TABLE 17.—GAS PRODUCTION, BY KINDS, AND NUMBER OF ESTABLISHMENTS, BY STATES: 1919 AND 1914.

STATE.	NUMBER OF ESTABLISH- MENTS.		GAS PRODUCED FOR SALE: M CUBIC FEET.	
	1919	1914	1919	1914
<b>ALL GAS.</b>				
United States.....	1,022	1,284	308,440,473	203,630,260
New York.....	96	131	76,730,459	51,776,737
Illinois.....	70	75	36,520,788	27,066,585
Pennsylvania.....	86	99	33,662,922	14,718,834
California.....	57	66	25,145,377	15,192,904
Massachusetts.....	51	61	20,177,864	13,431,185
New Jersey.....	38	43	18,343,949	12,774,402
Michigan.....	59	59	16,603,149	6,956,926
Indiana.....	53	60	8,195,504	5,602,717
Missouri.....	28	35	7,648,192	6,432,788
Maryland.....	16	18	7,252,586	4,083,192
Wisconsin.....	31	47	7,238,943	2,854,157
Connecticut.....	22	27	6,133,336	4,439,924
Minnesota.....	23	47	5,195,651	4,400,936
Iowa.....	68	113	4,017,690	3,310,860
Rhode Island.....	4	6	2,879,860	2,415,708
Texas.....	25	27	2,745,958	1,597,882

TABLE 17.—GAS PRODUCTION, BY KINDS, AND NUMBER OF ESTABLISHMENTS, BY STATES: 1919 AND 1914—Continued.

STATE.	NUMBER OF ESTABLISH- MENTS.		GAS PRODUCED FOR SALE: M CUBIC FEET.	
	1919	1914	1919	1914
<b>ALL GAS—Continued.</b>				
Virginia.....	17	22	2,595,359	1,878,773
Oregon.....	11	9	2,556,215	1,739,624
Washington.....	12	13	2,450,219	1,947,292
Georgia.....	17	19	2,097,916	1,567,179
Colorado.....	10	8	2,005,498	1,733,441
Nebraska.....	20	48	1,644,175	1,305,335
Tennessee.....	10	12	1,382,539	1,169,659
Alabama.....	12	14	1,212,748	925,271
Florida.....	14	14	996,777	714,361
New Hampshire.....	13	14	780,868	580,749
Delaware.....	7	8	773,368	594,696
North Carolina.....	22	20	768,736	493,006
Maine.....	13	17	680,716	546,309
Ohio.....	15	25	660,720	1,147,150
South Carolina.....	10	12	612,981	380,804
Arizona.....	9	9	360,729	168,856
South Dakota.....	12	17	330,886	232,745
Vermont.....	9	9	279,076	227,214
Montana.....	6	6	235,339	156,193
Mississippi.....	7	8	226,624	202,990
Kentucky.....	10	13	175,841	502,444
North Dakota.....	5	9	147,754	182,288
Kansas.....	7	12	140,026	94,311
All other states.....	26	32	6,802,529	5,062,738
<b>COAL GAS.</b>				
United States.....	233	277	8,029,740	10,500,946
Wisconsin.....	12	15	1,177,122	1,019,536
Indiana.....	22	20	1,175,450	482,220
Michigan.....	31	39	959,328	1,514,418
Massachusetts.....	9	12	543,480	761,087
Illinois.....	19	20	525,510	876,185
New York.....	17	25	404,290	1,822,073
Ohio.....	8	9	292,283	197,150
North Carolina.....	6	6	252,926	176,017
Missouri.....	8	8	187,246	157,536
Mississippi.....	6	6	185,887	129,290
Virginia.....	4	6	183,411	221,068
Minnesota.....	4	7	172,447	259,814
Washington.....	6	6	157,918	168,837
Kentucky.....	8	9	128,729	126,061
Iowa.....	5	9	127,191	387,125
Pennsylvania.....	9	10	126,338	729,665
Georgia.....	8	8	112,889	148,287
Alabama.....	5	8	103,445	123,232
Maine.....	6	6	102,026	112,961
Maryland.....	5	5	85,567	72,323
All other states.....	35	43	965,918	1,025,006
<b>CARBURETED WATER GAS.</b>				
United States.....	401	430	90,790,299	90,017,725
New York.....	46	52	38,917,795	34,593,594
Pennsylvania.....	62	69	18,345,693	3,896,311
New Jersey.....	21	24	5,067,034	8,222,442
Illinois.....	21	25	4,131,266	24,038,259
Iowa.....	43	43	2,560,171	1,730,540
Connecticut.....	15	14	2,100,102	1,592,562
Texas.....	13	14	1,948,768	1,244,171
Nebraska.....	16	20	1,620,330	1,264,451
Massachusetts.....	17	15	1,460,963	711,761
Indiana.....	10	11	1,382,973	1,173,224
Missouri.....	13	14	1,181,112	625,809
Wisconsin.....	12	13	646,697	471,177
Florida.....	11	11	604,991	412,449
New Hampshire.....	7	5	583,715	180,018
Georgia.....	4	4	528,562	370,423
South Carolina.....	6	7	501,348	357,500
South Dakota.....	10	7	323,635	194,187
Vermont.....	7	7	206,311	164,204
Maryland.....	7	8	175,253	4,005,066
Minnesota.....	11	8	102,883	65,610
North Carolina.....	9	9	154,243	80,063
Michigan.....	6	6	121,441	48,457
Virginia.....	3	4	113,515	76,293
Ohio.....	4	7	69,919	202,891
All other states.....	27	33	7,287,469	4,232,252
<b>MIXED COAL AND WATER GAS.</b>				
United States.....	190	147	179,871,832	86,281,339
New York.....	15	15	37,321,574	18,289,899
Illinois.....	20	14	31,299,551	2,090,287
Massachusetts.....	21	22	18,132,994	11,888,775
Michigan.....	21	12	15,509,168	5,407,222
Pennsylvania.....	7	4	15,153,512	10,034,404
Wisconsin.....	8	4	5,409,849	1,360,350
Indiana.....	11	10	5,153,333	3,926,280
Connecticut.....	6	7	4,018,912	2,818,173
Rhode Island.....	3	3	2,851,253	2,352,355
Virginia.....	8	6	2,290,365	1,572,249
Washington.....	4	3	2,227,705	1,694,906
Colorado.....	4	4	1,826,270	1,581,433
Iowa.....	9	7	1,338,528	1,106,466
Alabama.....	6	3	1,100,684	793,225
North Carolina.....	5	3	356,206	229,664
All other states.....	42	30	35,845,922	21,180,370

# MANUFACTURED GAS.

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TABLE 17.—GAS PRODUCTION, BY KINDS, AND NUMBER OF ESTABLISHMENTS, BY STATES: 1919 AND 1914—Continued.

STATE.	NUMBER OF ESTABLISHMENTS.		GAS PRODUCED FOR SALE: M CUBIC FEET.	
	1919	1914	1919	1914
<b>OIL GAS.</b>				
United States.....	137	153	15,421,836	16,512,274
California.....	53	63	12,023,777	13,910,848
Oregon.....	7	5	2,481,915	1,650,381
Arizona.....	8	8	336,893	103,864
All other states.....	69	77	579,341	751,181
<b>ACETYLENE.</b>				
United States.....	37	165	5,077	14,868
New York.....	11	20	2,297	3,129
Indiana.....	8	19	778	1,736
Pennsylvania.....	3	9	358	689
Illinois.....	4	8	310	632
All other states.....	11	109	1,325	8,682
<b>GASOLINE GAS.</b>				
United States.....	22	112	20,428	181,412
Iowa.....	9	43	9,447	67,925
New York.....	4	14	1,698	8,722
All other states.....	9	55	9,283	101,765
<b>ENRICHED NATURAL GAS.</b>				
United States.....	7		14,205,252	
California.....	3		13,120,640	
All other states.....	4		1,174,612	

The figures show a decrease in total production in three states only, Kentucky, North Dakota, and Ohio. In more than half the states, coal gas shows a decrease, while only four states, Illinois, Maryland, New Jersey, and Ohio, reported less carbureted water gas in 1919 than in 1914. An increase in the production of mixed coal and water gas was general, no state showing a decrease.

\* **Mixed coal and water gas.**—Table 18 shows, by geographic divisions, the total production of coal gas, and of carbureted water gas, including that sold as such and that entering into the composition of mixed coal and water gas.

The largest proportion of coal gas sold as such, 41 per cent, is shown for the West South Central division, while the largest portion entering into the production of mixed gas, 97.4 per cent, is found in the Middle Atlantic division. The proportion of all water gas that was used in the production of mixed gas ran as high as 93.5 per cent in the East South Central division, while in the West South Central division it dropped to 8.5 per cent.

TABLE 18.—TOTAL PRODUCTION OF COAL GAS AND CARBURETED WATER GAS: 1919.

DIVISION.	COAL GAS.				CARBURETED WATER GAS.				MIXED COAL AND WATER GAS.		
	Total production, M cubic feet.	Sold as such.		Constituent of mixed gas.		Total production, M cubic feet.	Sold as such.		Constituent of mixed gas.		Constituents: Per cent.
		M cubic feet.	Per cent of total.	M cubic feet.	Per cent of total.		M cubic feet.	Per cent of total.	M cubic feet.	Per cent of total.	
United States.....	101,425,198	9,159,519	9.0	92,265,679	91.0	208,726,631	99,264,592	47.6	109,462,039	52.4	201,727,718
New England.....	12,451,378	841,164	6.8	11,610,214	93.2	21,010,044	4,950,260	23.6	16,059,784	76.4	27,669,998
Middle Atlantic.....	31,599,751	817,497	2.6	30,782,254	97.4	109,044,894	68,657,937	63.0	40,486,957	37.0	71,169,211
East North Central.....	35,796,094	4,004,389	12.9	31,191,705	87.1	41,743,754	6,717,100	16.1	35,032,654	83.9	60,224,350
West North Central.....	10,859,220	773,144	7.1	10,086,076	92.9	11,574,616	6,439,295	55.6	5,135,323	44.4	15,221,399
South Atlantic.....	4,554,134	802,300	17.6	3,751,834	82.4	16,878,821	7,903,332	46.8	8,975,489	53.2	12,727,323
East South Central.....	1,989,243	543,907	27.6	1,449,336	72.4	1,542,763	100,737	6.5	1,442,026	93.5	2,882,362
West South Central.....	281,302	115,388	41.0	163,914	59.0	4,595,174	4,203,255	91.5	391,919	8.5	557,833
Mountain.....	2,456,850	412,514	16.8	2,044,345	83.2	962,387	186,167	19.3	776,200	80.7	2,820,545
Pacific.....	1,437,217	244,216	17.0	1,193,001	83.0	1,363,195	106,508	7.8	1,261,687	92.2	2,454,688

**Quality of gas.**—At the census of 1914, out of 1,284 establishments covered, 1,055 reported the candlepower and 811 reported the heating value in British thermal units. In 1919, out of 1,022 establishments, only 389 reported candlepower, while 737 reported heating value. This illustrates the tendency resulting from the use of the incandescent mantle, by reason of which heating value instead of luminosity is becoming the standard of measurement. Table 19 shows the

number of establishments and the quantity of gas, by geographic divisions, for specified groups based on the quality of gas in terms of British thermal units. While, in 1919, as in 1914, the group "575 to 625 B. t. u." has the largest number of establishments, the group "550 to 574 B. t. u." shows a relatively large increase, indicating that the prevailing standard is lower than in 1914. In agreement with this is the decrease in both of the higher groups.

## MANUFACTURES.

TABLE 19.—HEATING VALUE—PRODUCTION ACCORDING TO QUANTITY, BRITISH THERMAL UNITS PER CUBIC FOOT, BY GEOGRAPHIC DIVISIONS: 1919.

DIVISION.	TOTAL.		QUALITY NOT REPORTED.		LESS THAN 500 B. T. U.		500 TO 549 B. T. U.		550 TO 574 B. T. U.		575 TO 624 B. T. U.		625 TO 649 B. T. U.		650 AND OVER B. T. U.	
	Number of establishments.	Thousand cu. ft. <sup>1</sup>	Number of establishments.	Thousand cu. ft.												
United States:																
1919.....	1,022	308,440,473	285	83,410,753	10	330,938	82	22,441,655	206	73,449,002	388	98,593,537	20	15,676,831	31	14,537,757
1914.....	1,254	203,639,260	473	(1)	(1)	(1)	2 10	61	(1)	538	116	(1)	86	(1)	14,537,757	
New England.....	112	30,931,720	15	270,730	.....	.....	45	20,728,820	27	4,457,200	23	5,447,513	.....	2	27,438	
Middle Atlantic.....	220	128,737,330	73	75,981,583	.....	.....	2	9,928	36	4,829,548	92	33,355,064	8	14,104,818	9	456,389
East North Central.....	231	69,219,410	66	3,832,574	1	5,027	5	579,667	49	37,909,930	104	25,761,563	1	8,475	5	1,122,168
West North Central.....	161	19,154,374	50	484,989	1	4,911	15	317,102	32	2,875,330	54	13,985,731	8	1,481,394	1	4,817
South Atlantic.....	108	19,394,939	32	1,475,199	.....	.....	6	220,619	15	7,926,207	47	9,670,362	2	45,286	6	57,266
East South Central.....	39	2,997,752	20	722,576	1	20,578	4	347,254	4	754,132	8	1,115,917	.....	2	37,265	
West South Central.....	32	4,507,251	12	160,180	3	221,448	1	22,654	6	348,581	10	3,754,388	.....	2	82,728	
Mountain.....	39	3,345,886	7	96,149	4	78,974	3	199,945	5	558,117	17	2,293,115	1	36,858	4	12,749,586
Pacific.....	80	30,151,811	10	396,763	.....	.....	1	15,627	32	13,789,951	33	3,200,884	.....	.....	.....	.....

<sup>1</sup> Figures not available.<sup>2</sup> Under 550 B. t. u.

Table 20 shows, by states, gas production distributed by kind and by British thermal-unit groups. The highest average heating value (631 B. t. u.) appears

in Pennsylvania for mixed coal and water gas, and the lowest (540 B. t. u.) in Massachusetts for the same gas.

TABLE 20.—HEATING VALUE—PRODUCTION, BY KINDS OF GAS, FOR LEADING STATES: 1919.

KIND OF GAS AND STATE.	GAS PRODUCED FOR SALE BY ESTABLISHMENTS REPORTING QUALITY IN B. T. U.: 1919.								GAS PRODUCED BY ESTABLISHMENTS NOT REPORTING B. T. U.			
	Quantity (million cu. ft.).	Per cent of total.	Average B. t. u.	B. t. u. groups—million cu. ft.								
				Less than 500.	500 to 549.	550 to 574.	575 to 599.	600 to 624.	625 to 649.	650 and over.		
<b>MIXED COAL AND WATER GAS.</b>												
United States.....	143,038	79.5	587	32	18,725	46,832	17,949	44,788	14,015	697	36,834	20.5
New York.....	4,427	11.9	592	.....	.....	23	3,621	124	659	.....	32,895	88.1
Illinois.....	29,058	92.8	566	.....	.....	28,135	854	69	.....	2,242	7.2	
Massachusetts.....	18,133	100.0	540	.....	10,429	1,085	610	.....	.....	.....	662	4.4
Michigan.....	14,847	95.7	595	.....	142	774	1,920	12,011	.....	.....	31	0.2
Pennsylvania.....	15,123	99.8	631	.....	1,543	196	.....	18,356	28	669	1,004	1.6
All other.....	61,450	98.4	599	32	2,154	15,272	10,739	32,584	.....	.....	.....	.....
<b>CARBURETED WATER GAS.</b>												
United States.....	46,075	50.7	580	222	3,222	9,831	14,954	15,836	1,497	513	44,721	49.3
New York.....	9,772	25.1	580	.....	.....	18	8,875	625	44	210	29,146	74.9
Pennsylvania.....	4,703	25.6	554	.....	10	3,011	1,384	263	6	29	13,643	74.4
New Jersey.....	5,644	99.6	602	.....	.....	11	5,487	.....	.....	146	23	0.4
Illinois.....	3,968	96.1	575	5	2,024	1,888	71	.....	.....	163	3.9	
Iowa.....	2,298	89.8	580	.....	48	1,139	55	1,047	9	262	1,484	10.2
All other.....	19,690	92.9	570	217	3,164	3,028	2,772	8,343	1,438	128	.....	.....
<b>COAL GAS.</b>												
United States.....	6,968	86.8	587	21	455	2,018	1,542	2,668	54	210	1,062	13.2
Wisconsin.....	1,177	100.0	600	.....	.....	.....	.....	1,177	.....	.....	51	4.3
Indiana.....	1,124	95.7	556	.....	117	759	188	60	.....	217	22.6	
Michigan.....	742	77.4	583	.....	17	143	348	234	.....	.....	.....	.....
Massachusetts.....	543	100.0	571	.....	65	38	388	52	.....	.....	.....	.....
Illinois.....	404	76.8	567	.....	4	330	56	14	.....	122	23.2	
All other.....	2,978	81.6	602	21	252	748	502	1,131	54	210	672	18.4
<b>OIL GAS.</b>												
United States.....	14,481	96.8	562	.....	16	13,812	48	539	37	29	1,493	3.2
California.....	11,648	97.1	560	.....	16	11,387	23	213	.....	9	342	2.9
Oregon.....	2,472	100.0	571	.....	.....	2,403	25	33	.....	11	.....	.....
Arizona.....	309	91.7	603	.....	.....	.....	.....	272	37	28	123	3.3
All other.....	52	29.7	600	.....	22	.....	.....	21	9	9	123	70.3

<sup>1</sup> Not including Pintsch gas, of which 448 million cu. ft. was produced for sale.

Table 21 shows, by geographic divisions, the number of establishments reporting candlepower, classified by groups, for 1919 and 1914. In 1909, 92 per

cent of the establishments reported candlepower; in 1914, 82 per cent; and in 1919 only 38 per cent.

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TABLE 21.—ILLUMINATING VALUE—NUMBER OF ESTABLISHMENTS REPORTING CANDLEPOWER: 1919 AND 1914.

DIVISION.	Census year.	Total number of establish- ments.	CANDLEPOWER GROUPS. <sup>1</sup>													
			Not re- porting candle- power.	Under 15.	15.	16.	17.	18.	19.	20.	21.	22.	23.	24.	25.	Over 25.
United States.....	1919	1,022	633	27	20	84	28	93	10	54	12	38	2	5	3	13
	1914	1,284	229	24	26	194	96	226	54	151	51	86	16	16	15	100
	1909	1,296	105	23	15	146	91	207	48	170	53	101	31	36	29	241
New England.....	1919	112	85	5	3	3	2	6	3	4	1	3	2	1	3	7
	1914	134	18	.....	1	15	20	32	7	19	4	5	3	2	1	1
Middle Atlantic.....	1919	220	145	3	5	5	3	12	3	12	4	22	2	4	1	4
	1914	273	51	5	5	25	7	23	10	43	26	47	3	7	6	15
East North Central.....	1919	231	159	10	1	27	11	10	1	10	4	1	2	2	1	20
	1914	266	43	10	3	59	30	45	13	28	4	7	2	2	2	20
West North Central.....	1919	161	70	6	6	24	3	33	3	7	6	6	5	6	3	3
	1914	251	90	1	4	43	15	43	4	20	3	13	6	5	6	29
South Atlantic.....	1919	108	58	1	2	9	3	14	2	12	3	2	1	1	1	1
	1914	121	11	2	2	17	6	27	10	18	6	6	3	3	3	13
East South Central.....	1919	39	19	1	6	6	5	2	.....	3	1	1	2	2	2	4
	1914	47	3	2	5	15	5	11	.....	2	2	1	2	2	2	6
West South Central.....	1919	32	17	1	.....	1	1	6	1	5	2	1	2	2	2	6
	1914	37	5	.....	4	1	7	1	9	2	2	1	2	2	2	6
Mountain.....	1919	39	27	2	2	4	4	3	3	2	6	3	3	3	3	3
	1914	37	3	2	4	5	2	7	2	6	3	3	3	3	3	3
Pacific.....	1919	80	53	2	2	5	2	10	31	7	1	2	4	4	4	2
	1914	88	5	2	2	11	10	31	7	8	6	1	1	1	1	4

<sup>1</sup> Per 5-foot burners.

Distribution.—Table 22 shows the quantity of gas sold, used on premises, and unaccounted for, by kind and by geographic divisions. This information is not available for prior censuses.

TABLE 22.—DISTRIBUTION OF GAS PRODUCED, BY KIND, AND BY GEOGRAPHIC DIVISIONS: 1919.

KIND AND DIVISION.	Total production (M cu. ft.)	SOLD.		Used on premises.	Unac- counted for.
		For illuminating, household, and industrial pur-poses.	For distribution by other companies.		
United States.....	344,119,811	1271,579,422	36,861,053	7,491,158	28,188,178
Mixed coal and water gas.....	201,727,718	165,488,341	14,383,491	7,017,680	14,838,206
Carbureted water gas.....	99,264,590	70,391,270	20,405,020	294,137	8,174,154
Oil gas.....	18,008,182	15,309,111	112,725	93,847	2,492,498
Coal gas.....	9,159,519	7,691,837	338,412	74,213	1,055,557
Other gas.....	15,959,803	12,699,363	1,621,396	11,281	1,627,703
Mixed coal and water gas:					
New England.....	27,689,999	22,935,463	2,639,056	595,691	1,499,738
Middle Atlantic.....	71,169,211	53,459,661	11,492,193	194,089	5,993,268
East North Central.....	66,224,359	57,476,231	218,117	4,066,903	4,433,108
West North Central.....	15,221,399	12,478,167	27,915	2,046,131	669,186
South Atlantic.....	12,727,323	11,530,316	.....	41,492	1,155,515
East South Central.....	2,882,362	2,449,096	6,210	11,676	421,590
West South Central.....	557,833	495,906	2,320	55,397	55,397
Mountain.....	2,820,545	2,405,790	.....	4,938	409,791
Pacific.....	2,454,688	2,227,705	.....	24,420	202,563
Carbureted water gas:					
New England.....	4,950,230	4,300,117	237,272	18,161	394,710
Middle Atlantic.....	68,657,035	44,134,253	18,708,289	108,356	5,550,057
East North Central.....	6,717,100	5,308,441	1,043,856	15,564	349,240
West North Central.....	6,439,295	5,809,509	248	20,813	509,728
South Atlantic.....	7,903,332	6,735,339	327,385	39,053	751,555
East South Central.....	100,737	81,051	.....	242	19,444
West South Central.....	4,203,255	3,608,568	.....	21,529	575,158
Mountain.....	188,167	179,304	.....	1,208	5,055
Pacific.....	106,508	96,688	.....	211	9,609
Oil gas:					
New England.....	78,754	78,754	.....	.....	.....
Middle Atlantic.....	108,543	108,543	.....	.....	.....
East North Central.....	74,016	71,764	27	2,225	.....
West North Central.....	92,991	78,670	.....	14,321	.....
South Atlantic.....	49,020	49,020	.....	.....	.....

<sup>1</sup> Of this, 23,621,320 M. cu. ft. were reported as sold for industrial use, but as many gas plants were unable to report gas sold for industrial use separate from that for illuminating and household use, this figure does not represent the total industrial use of gas.

TABLE 22.—DISTRIBUTION OF GAS PRODUCED, BY KIND, AND BY GEOGRAPHIC DIVISIONS: 1919—Continued.

KIND AND DIVISION.	Total production (M cu. ft.)	SOLD.		Used on premises.	Unac- counted for.
		For illuminating, household, and industrial purposes.	For distribution by other companies.		
Oil gas—Continued.					
East South Central.....	23,154	23,154	.....	.....	729
West South Central.....	94,647	93,918	.....	5,295	37,539
Mountain.....	455,155	412,321	.....	4,520	41,834
Pacific.....	17,031,901	14,392,967	112,725	88,525	2,437,684
Coal gas:					
New England.....	841,164	740,251	.....	10,872	90,041
Middle Atlantic.....	817,497	660,528	50,824	6,481	99,664
East North Central.....	4,604,339	3,849,715	280,323	39,993	434,355
West North Central.....	773,144	643,956	7,292	7,118	111,808
South Atlantic.....	802,300	702,404	.....	1,985	97,911
East South Central.....	548,907	444,451	4,590	4,590	99,806
West South Central.....	115,358	97,451	374	374	17,533
Mountain.....	412,514	345,465	1,697	1,697	62,352
Pacific.....	244,216	201,088	1,103	1,103	42,027
Other gas:					
New England.....	1,027	807	.....	.....	220
Middle Atlantic.....	5,157	5,081	7	7	89
East North Central.....	1,130,769	970,961	6,828	6,828	152,980
West North Central.....	16,705	15,647	180	180	878
South Atlantic.....	475	475	.....	.....	.....
East South Central.....	238,347	207,168	426	426	50,753
West South Central.....	.....	.....	.....	.....	.....
Mountain.....	14,547,323	11,493,244	1,621,396	3,840	1,422,843

Of the total production in 1919, 78.9 per cent was sold direct to consumers, and 10.7 per cent to other companies for distribution, while 2.2 per cent was used by the producing companies for heating retorts, lighting, etc., and the remainder, 8.2 per cent, reported as "unaccounted for", covered loss through leakage, etc. It was found impossible to obtain accurate data in regard to the gas used industrially, as many producers were unable to give segregated figures for household and industrial use. The amount reported as sold for industrial use, 23,621,320 M. cu. ft., does

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not, therefore, represent the total, though it is probable that it covers the greater portion, as the companies which gave segregated figures were as a rule those situated in the chief industrial areas.

**Consumers and population.**—Table 23 shows the number of consumers reported, and the population of the territory served, for states and for geographic divisions. For the United States the ratio is 1 consumer to 5.2 persons in the territory supplied. The highest ratio of consumers to population was in the New England and Middle Atlantic divisions, where it was 1 to 4.7 while the lowest was in the East South Central division, 1 consumer to 11.1 of the population. Illinois shows the highest ratio, 1 to 4, and Oklahoma lowest, 1 to 17.4.

**Gas rates.**—Table 24 shows the number of establishments and the amount of gas sold under certain specified rate groups, by states and by geographic divisions. It is difficult to make a satisfactory tabulation of the rates charged for gas, owing to the difference in rate scales, some companies basing their charges on a flat rate per thousand cubic feet, while others use a sliding scale, the rate varying in inverse ratio to the quantity of gas consumed. In cases where practically the entire output of a plant was sold at one rate or at rates within the limits of a rate group, the quantity was tabulated under the rate charged for the bulk of it, even though charges were computed on a sliding scale. On the other hand, the output of establishments basing their charges on a sliding scale so graduated that the preponderating portion of the gas could not be tabulated in any one of the rate columns, is included in the "sliding scale" column.

Of the total gas produced for sale, 51.3 per cent was reported by 6.7 per cent of the establishments at less than \$1 per thousand cubic feet, while 6.8 per cent of the establishments reported one-tenth of one per cent of the gas at over \$2 per thousand cubic feet. The latter includes the acetylene plants. The largest number of establishments under any one group was 229, or 22.4 per cent of the total, under the group "\$1.55 to \$2.00," with 1.6 per cent of the gas sold.

TABLE 23.—NUMBER OF CONSUMERS AND POPULATION OF TERRITORY SUPPLIED, BY GEOGRAPHIC DIVISIONS AND STATES: 1919.

DIVISION AND STATE.	Number of consumers.	Population of territory supplied.
UNITED STATES.....	8,253,165	42,991,579
GEOGRAPHIC DIVISIONS:		
New England.....	1,071,576	5,078,115
Middle Atlantic.....	3,199,457	15,098,932
East North Central.....	1,837,125	8,765,615
West North Central.....	619,687	3,336,070
South Atlantic.....	475,808	3,403,156
East South Central.....	91,705	1,018,038
West South Central.....	128,461	1,120,085
Mountain.....	118,649	925,842
Pacific.....	710,717	4,240,076
NEW ENGLAND:		
Maine.....	32,201	205,800
New Hampshire.....	35,567	225,900
Vermont.....	15,526	83,000
Massachusetts.....	661,106	3,042,232
Rhode Island.....	95,967	451,200
Connecticut.....	231,209	1,069,983
MIDDLE ATLANTIC:		
New York.....	1,852,874	8,234,916
New Jersey.....	646,053	2,724,014
Pennsylvania.....	699,630	4,140,012
EAST NORTH CENTRAL:		
Ohio.....	16,961	260,094
Indiana.....	226,198	1,357,618
Illinois.....	1,004,177	4,122,159
Michigan.....	387,685	2,019,781
Wisconsin.....	202,104	1,005,963
WEST NORTH CENTRAL:		
Minnesota.....	158,928	822,091
Iowa.....	152,732	829,554
Missouri.....	221,213	1,132,282
North Dakota.....	6,091	45,826
South Dakota.....	14,002	91,100
Nebraska.....	62,041	352,837
Kansas.....	4,660	32,400
SOUTH ATLANTIC:		
Delaware.....	24,558	158,800
Maryland.....	158,465	843,860
District of Columbia.....	76,676	423,664
Virginia.....	68,509	557,000
West Virginia.....	2,979	29,750
North Carolina.....	27,437	361,082
South Carolina.....	17,565	189,000
Georgia.....	58,875	520,000
Florida.....	40,744	325,000
EAST SOUTH CENTRAL:		
Kentucky.....	8,083	93,920
Tennessee.....	41,971	370,147
Alabama.....	32,993	427,971
Mississippi.....	8,658	126,000
WEST SOUTH CENTRAL:		
Arkansas.....	765	8,000
Louisiana.....	52,927	426,000
Oklahoma.....	892	15,000
Texas.....	73,907	671,085
MOUNTAIN:		
Montana.....	11,226	107,500
Idaho.....	4,821	43,000
Wyoming.....	1,461	22,000
Colorado.....	66,202	412,016
New Mexico.....	2,280	27,000
Arizona.....	12,970	125,036
Utah.....	17,031	169,000
Nevada.....	2,528	20,290
PACIFIC:		
Washington.....	92,956	719,000
Oregon.....	69,188	418,000
California.....	548,573	3,101,676

TABLE 24.—RATES (NET) CHARGED FOR GAS—QUANTITY OF GAS SOLD, BY RATE GROUPS, BY GEOGRAPHIC DIVISIONS: 1919.

DIVISION.	TOTAL.		UNDER \$1.00.		\$1.00 TO \$1.25.		\$1.30 TO \$1.50.		\$1.55 TO \$2.00.		OVER \$2.00.		SLIDING SCALE.		RATE NOT REPORTED.	
	Number of establishments.	Gas sold (M cu. ft.).	Number of establishments.	Gas sold (M cu. ft.).	Number of establishments.	Gas sold (M cu. ft.).	Number of establishments.	Gas sold (M cu. ft.).	Number of establishments.	Gas sold (M cu. ft.).	Number of establishments.	Gas sold (M cu. ft.).	Number of establishments.	Gas sold (M cu. ft.).	Number of establishments.	Gas sold (M cu. ft.).
United States.....	1,022	308,440,473	68	158,311,552	147	51,480,625	153	9,760,603	229	4,917,831	69	305,045	234	64,889,371	122	18,775,146
New Eng'nd.....	112	30,631,729	1	22,244	26	17,731,628	13	1,166,791	29	1,019,676	13	135,299	26	10,809,249	4	47,223
Middle Atlantic.....	220	128,737,330	24	82,152,867	22	17,814,210	38	2,678,423	46	1,184,280	22	16,975	30	8,770,617	38	16,114,168
East North Central.....	231	69,210,410	26	27,636,697	48	4,872,601	31	841,470	30	629,219	13	5,472	56	34,991,575	27	1,142,186
West North Central.....	161	19,154,374	4	11,194,679	19	3,649,718	26	834,145	63	970,360	7	7,653	26	1,777,760	16	404,029
South Atlantic.....	108	19,394,639	5	11,674,914	11	2,542,610	19	1,372,440	39	512,079	6	15,475	26	3,224,188	11	73,223
East South Central.....	239	2,997,752	1	633,266	10	1,563,651	9	206,325	10	186,862	2	34,472	2	314,216	7	73,889
West South Central.....	32	4,507,251	1	12,110	3	876,129	10	2,357,672	3	42,552	1	12,605	8	1,098,462	6	67,440
Mountain.....	39	3,345,886	1	1,582,073	3	527,559	4	189,315	8	210,213	2	26,240	17	755,623	4	54,863
Pacific.....	80	30,151,811	5	23,467,599	5	1,611,548	3	73,522	10	163,160	5	82,416	43	4,042,351	9	711,395

**Equipment.**—No attempt was made to collect data in regard to production equipment, but certain data were asked for relative to the distributing systems. Table 25 shows the capacity of the gas storage holders, by states and by geographic divisions, in 1919. Of the total gas storage capacity in the United States, 38.8 per cent was reported from the Middle Atlantic division, which reported 41.7 per cent of the gas sold.

TABLE 25.—GAS STORAGE HOLDERS, BY GEOGRAPHIC DIVISIONS AND STATES: 1919.

DIVISION AND STATE.	Holder capacity. M cu. ft. 835,041	DIVISION AND STATE.	Holder capacity. M cu. ft.
UNITED STATES.....		SOUTH ATLANTIC:	
GEOGRAPHIC DIVISIONS:		Maryland.....	20,715
New England.....	136,623	District of Columbia.....	8,100
Middle Atlantic.....	324,419	Virginia.....	3,900
East North Central.....	174,005	West Virginia.....	173
West North Central.....	58,291	North Carolina.....	2,098
South Atlantic.....	47,931	South Carolina.....	1,215
East South Central.....	10,593	Georgia.....	5,764
West South Central.....	19,336	Florida.....	3,931
Mountain.....	6,912	EAST SOUTH CENTRAL:	
Pacific.....	57,111	Kentucky.....	786
NEW ENGLAND:		Tennessee.....	2,370
Maine.....	3,987	Alabama.....	6,321
New Hampshire.....	3,004	Mississippi.....	1,026
Vermont.....	1,150	WEST SOUTH CENTRAL:	
Massachusetts.....	90,002	Arkansas.....	220
Rhode Island.....	15,677	Louisiana.....	7,036
Connecticut.....	22,797	Oklahoma.....	60
MIDDLE ATLANTIC:		Texas.....	11,420
New York.....	210,109	MOUNTAIN:	
New Jersey.....	53,335	Montana.....	975
Pennsylvania.....	60,924	Idaho.....	410
EAST NORTH CENTRAL:		Wyoming.....	130
Ohio.....	5,723	Colorado.....	2,635
Illinois.....	91,350	New Mexico.....	100
Indiana.....	22,764	Arizona.....	805
Michigan.....	37,002	Utah.....	1,815
Wisconsin.....	17,180	Nevada.....	42
WEST NORTH CENTRAL:		PACIFIC:	
Minnesota.....	15,452	Washington.....	6,847
Iowa.....	10,774	Oregon.....	6,581
Missouri.....	26,350	California.....	43,683
North Dakota.....	610		
South Dakota.....	756		
Nebraska.....	3,914		
Kansas.....	345		

**Distributing mains.**—In Table 26 the miles of transmission and distributing mains reported in 1919 are tabulated, by states and by geographic divisions. New York ranked first, Illinois second, and California third in miles of mains, while in total quantity of gas produced these states ranked first, second, and fourth, respectively. The geographic division with

the largest mileage was the Middle Atlantic, with 30.7 per cent of the total.

TABLE 26.—DISTRIBUTING MAINS, BY GEOGRAPHIC DIVISIONS AND STATES: 1919.

DIVISION AND STATE.	Miles.	DIVISION AND STATE.	Miles.
UNITED STATES.....	1919.. 1914..	69,742 58,727	SOUTH ATLANTIC:
GEOGRAPHIC DIVISIONS:			Delaware..... Maryland..... District of Columbia..... Virginia..... West Virginia..... North Carolina..... South Carolina..... Georgia..... Florida.....
New England.....	8,109		222 969 550 699 36 498 235 606 697
Middle Atlantic.....	21,445		EAST SOUTH CENTRAL:
East North Central.....	15,836		Kentucky..... Tennessee..... Alabama..... Mississippi.....
West North Central.....	5,778		226 315 495 211
South Atlantic.....	4,512		
East South Central.....	1,247		
West South Central.....	1,578		
Mountain.....	1,410		
Pacific.....	9,827		
NEW ENGLAND:			
Maine.....	326		
New Hampshire.....	317		
Vermont.....	134		
* Massachusetts.....	4,731		
Rhode Island.....	739		
Connecticut.....	1,812		
MIDDLE ATLANTIC:			
New York.....	12,119		
New Jersey.....	4,724		
Pennsylvania.....	4,602		
EAST NORTH CENTRAL:			
Ohio.....	650		
Indiana.....	2,904		
Illinois.....	7,506		
Michigan.....	3,085		
Wisconsin.....	1,691		
WEST NORTH CENTRAL:			
Minnesota.....	1,230		
Iowa.....	1,745		
Missouri.....	1,726		
North Dakota.....	78		
South Dakota.....	179		
Nebraska.....	681		
Kansas.....	86		
PACIFIC:			
Washington.....	1,276		
Oregon.....	1,247		
California.....	7,304		

**Stoves and heaters.**—Table 27 shows the number of gas stoves and heaters connected with mains at the end of the year, by states and geographic divisions for 1919, 1914, and 1909. These figures are not to be taken as complete, as several large producers stated that the data were not available in 1919, and the same condition prevailed in the previous years. In so far as they are shown, they cover only the heating attachments connected, or known to be connected, by the company reporting. The per cent column indicates the proportion which the gas produced by establishments reporting stoves and heaters bears to the total gas (excluding Pintsch gas, gasoline gas, and acetylene) produced for sale in 1919.

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TABLE 27.—STOVES AND HEATERS CONNECTED WITH MAINS, BY GEOGRAPHIC DIVISIONS AND STATES: 1919, 1914, AND 1909.

DIVISION AND STATE.	1919		NUMBER OF STOVES AND HEATERS CONNECTED WITH MAINS AT END OF YEAR (AS REPORTED).		
	Number of establishments,	Per cent which gas produced for sale by establishments reporting stoves and heaters is of total. <sup>1</sup>			
			1919	1914	1909
UNITED STATES...	911	801	65.1	5,469,126	5,168,924
NEW ENGLAND:					3,603,435
Maine.....	11	11	100.0	37,206	28,172
New Hampshire.....	12	11	98.4	35,057	31,722
Vermont.....	9	8	95.8	13,217	11,677
Massachusetts.....	48	42	51.5	346,775	245,417
Rhode Island.....	4	3	94.6	73,786	19,301
Connecticut.....	21	18	81.1	167,415	103,369
MIDDLE ATLANTIC:					
New York.....	79	61	56.9	827,176	984,590
New Jersey.....	30	21	16.8	80,752	316,551
Pennsylvania.....	78	74	59.7	733,543	500,417
EAST NORTH CENTRAL:					410,243
Ohio.....	13	10	46.1	12,455	19,184
Indiana.....	45	38	77.0	195,220	169,597
Illinois.....	64	60	98.3	754,393	629,911
Michigan.....	58	46	85.1	82,895	276,653
Wisconsin.....	33	31	32.4	87,341	141,720
WEST NORTH CENTRAL:					91,208
Minnesota.....	20	18	8.7	20,263	42,779
Iowa.....	57	55	99.3	160,898	136,482
Missouri.....	24	19	9.4	28,494	139,422
North Dakota.....	4	4	100.0	6,446	8,588
South Dakota.....	11	11	100.0	16,679	11,286
Nebraska.....	18	18	100.0	76,191	71,317
Kansas.....	5	5	100.0	6,215	3,020
SOUTH ATLANTIC:					449
Delaware.....	6	6	100.0	20,914	15,244
Maryland and District of Columbia.....	14	12	63.0	185,302	132,713
Virginia.....	15	15	100.0	65,731	47,985
West Virginia.....	3	3	100.0	3,073	2,928
North Carolina.....	20	19	97.9	44,236	21,711
South Carolina.....	8	8	100.0	30,362	18,629
Georgia.....	16	14	76.5	57,387	53,744
Florida.....	13	12	98.6	66,352	40,502
EAST SOUTH CENTRAL:					20,550
Kentucky.....	9	9	100.0	6,389	68,393
Tennessee.....	7	7	100.0	77,822	50,063
Alabama.....	11	11	100.0	55,515	32,531
Mississippi.....	7	7	100.0	13,190	10,860
WEST SOUTH CENTRAL:					7,661
Arkansas.....	1	1	100.0	765	1,255
Louisiana.....	3	3	100.0	103,375	55,375
Oklahoma.....	1	1	100.0	1,088	4,484
Texas.....	21	19	96.3	116,313	52,978
MOUNTAIN:					45,190
Montana.....	5	5	100.0	12,116	8,604
Idaho.....	3	3	100.0	5,395	4,048
Wyoming.....	2	2	100.0	1,550	1,042
Colorado.....	10	7	96.1	103,985	92,789
New Mexico.....	2	2	100.0	1,900	1,883
Arizona.....	9	6	86.4	10,649	8,127
Utah.....	3	3	100.0	20,583	18,725
Nevada.....	2	2	100.0	1,809	1,820
PACIFIC:					864
Washington.....	12	10	99.4	119,284	91,504
Oregon.....	10	6	97.8	58,399	47,231
California.....	54	44	70.3	512,254	371,671
					183,897

<sup>1</sup> Not including Pintsch gas, gasoline (cold process) gas, and acetylene.

**Gas and electric light and power.**—Table 28 shows the number of establishments which operated electric light and power plants in conjunction with the manufacture of gas, by states and by geographic divisions, in 1919 and 1914. While a decrease of nearly 12 per cent is evident in the total number operating electric plants, the relative number so engaged increased from 30 per cent in 1914 to over 33 per cent in 1919.

TABLE 28.—ESTABLISHMENTS OPERATING GAS AND ELECTRIC LIGHT AND POWER PLANTS IN CONJUNCTION, BY GEOGRAPHIC DIVISIONS AND STATES: 1919 AND 1914.

DIVISION AND STATE.	NUMBER OF ESTABLISHMENTS.		NUMBER OPERATING GAS AND ELECTRIC PLANTS IN CONJUNCTION.	
	1919	1914		
			1919	1914
UNITED STATES.....				
	1,022		1,284	
			341	385
GEOGRAPHIC DIVISIONS:				
New England.....	112		134	
Middle Atlantic.....	220		237	
East North Central.....	231		266	
West North Central.....	161		281	
South Atlantic.....	108		121	
East South Central.....	39		47	
West South Central.....	32		37	
Mountain.....	39		37	
Pacific.....	80		88	
NEW ENGLAND:				
Maine.....	13		17	
New Hampshire.....	13		14	
Vermont.....	9		9	
Massachusetts.....	51		61	
Rhode Island.....	4		6	
Connecticut.....	22		27	
MIDDLE ATLANTIC:				
New York.....	96		131	
New Jersey.....	38		43	
Pennsylvania.....	86		99	
EAST NORTH CENTRAL:				
Ohio.....	15		25	
Indiana.....	53		60	
Illinois.....	70		75	
Michigan.....	59		59	
Wisconsin.....	34		47	
WEST NORTH CENTRAL:				
Minnesota.....	23		47	
Iowa.....	68		113	
Missouri.....	26		35	
North Dakota.....	5		9	
South Dakota.....	12		17	
Nebraska.....	20		48	
Kansas.....	7		12	
SOUTH ATLANTIC:				
Delaware.....	7		8	
Maryland.....	16		18	
District of Columbia.....	2		3	
Virginia.....	17		22	
West Virginia.....	3		5	
North Carolina.....	22		20	
South Carolina.....	10		12	
Georgia.....	17		19	
Florida.....	14		14	
EAST SOUTH CENTRAL:				
Kentucky.....	10		13	
Tennessee.....	10		12	
Alabama.....	12		14	
Mississippi.....	7		8	
WEST SOUTH CENTRAL:				
Arkansas.....	1		1	
Louisiana.....	4		4	
Oklahoma.....	2		5	
Texas.....	25		27	
MOUNTAIN:				
Montana.....	6		6	
Idaho.....	4		4	
Wyoming.....	2		1	
Colorado.....	10		8	
New Mexico.....	2		2	
Arizona.....	9		9	
Utah.....	4		4	
Nevada.....	2		3	
PACIFIC:				
Washington.....	12		13	
Oregon.....	11		9	
California.....	57		66	

**Municipal establishments.**—The establishments owned by municipalities are operated under conditions somewhat different from the commercial companies, and the statistics therefor, though included in the other tables, are presented in Table 29 in detail.

The gas works of Philadelphia, though owned by the city, are operated by a private corporation and are not here included. The decrease of 81 in number of establishments in 1919, as compared with 1914, is in the town and village acetylene and gasoline plants of the North Central and South Atlantic states.

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TABLE 29.—MUNICIPAL ESTABLISHMENTS: 1919 AND 1914.

	UNITED STATES.		GEOGRAPHIC DIVISION.					
			New England.		Middle Atlantic.		East North Central.	
	1919	1914	1919	1914	1919	1914	1919	1914
Number of establishments <sup>1</sup> .....	57	138	5	5	5	5	8	26
Number manufacturing:								
Straight coal gas.....	11	11	1	1	1	1	1	3
Carbureted water gas.....	18	18	1	2	1	1	3	3
Mixed coal and water gas.....	6	3	3	2			1	
Oil gas.....	2	4						
Acetylene.....	8	31			4	3	1	0
Gasoline (cold process) gas.....	12	71				1	2	14
Number operating gas and electric light and power plants in conjunction.....	14	16	3	5	1		1	2
Persons engaged.....	666	542	238	193	7	8	80	42
Salaried employees.....	93	112	32	45	2	2	18	10
Wage earners (average number).....	573	430	216	148	5	6	62	32
Primary horsepower.....	2,693	2,224	240	174	10	13	236	272
Capital.....	\$7,858,740	\$5,554,187	\$2,526,077	\$1,353,060	\$104,764	\$44,280	\$955,690	\$273,137
Salaries and wages.....	\$771,452	\$337,659	\$292,426	\$124,222	\$5,003	\$4,017	\$84,612	\$19,665
Salaries.....	\$105,172	\$35,918	\$28,973	\$24,539	\$2,600	\$315	\$23,365	\$2,381
Wages.....	\$666,280	\$271,741	\$263,453	\$99,083	\$2,400	\$3,702	\$60,747	\$17,257
Cost of materials.....	\$1,366,703	\$717,371	\$288,070	\$167,021	\$25,308	\$10,831	\$150,118	\$70,625
Value of products.....	\$2,778,069	\$1,757,017	\$653,314	\$473,620	\$32,107	\$24,103	\$313,482	\$101,004
Value added by manufacture <sup>1</sup> .....	\$1,411,366	\$1,039,546	\$364,335	\$306,599	\$3,799	\$13,272	\$103,364	\$39,379
<b>MATERIALS.</b>								
Total cost.....	\$1,366,703	\$717,371	\$288,079	\$167,021	\$25,308	\$10,831	\$150,118	\$70,625
Coal used for gas making:								
Net tons.....	66,965	74,944	25,477	27,124	728	377	13,533	
Cost.....	\$395,767	\$256,579	\$160,800	\$119,165	\$7,011	\$2,020	\$93,806	
Coke, purchased, used for gas making:								
Net tons.....	8,080	5,709	1,500	610			1,780	1,809
Cost.....	\$90,754	\$23,035	\$12,750	\$2,709			\$18,739	\$8,503
Oil used for gas making and enriching:								
Gallons.....	5,412,952	3,790,220	717,751	537,414	\$4,123	62,028	353,862	383,657
Cost.....	\$129,850	\$182,569	\$62,399	\$27,277	\$4,760	\$2,517	\$28,122	\$14,109
Gasoline for gas making:								
Gallons.....	53,021	746,371				1,430	11,220	151,949
Cost.....	\$13,820	\$130,000				\$429	\$3,894	\$27,758
Calcium carbide:								
Pounds.....	263,200	1,612,275			178,800	736,000	34,000	207,400
Cost.....	\$11,532	\$33,508			\$7,244	\$5,060	\$1,584	\$7,022
Fuel for boilers and retorts, cost.....								
Amount paid for lamps and appliances purchased for sale.....	\$30,363	\$30,270	\$1,615	\$722	\$3,500	\$389	\$16,410	\$5,637
All other materials, cost.....	\$37,412	\$16,634	\$1,480	\$8,081		\$140	\$712	\$146
	\$343,205	\$39,136	\$43,935	\$9,117	\$2,787	\$276	\$16,871	\$7,450
<b>PRODUCTS.</b>								
Total value.....	\$2,778,069	\$1,757,017	\$653,314	\$473,620	\$32,107	\$24,103	\$313,482	\$101,004
Gas:								
M cubic feet.....	2,180,030	1,636,371	450,237	383,813	21,131	13,093	210,820	100,749
Value.....	\$2,520,698	\$1,579,886	\$597,086	\$390,291	\$32,107	\$23,932	\$248,932	\$98,548
Straight coal gas—								
M cubic feet.....	307,902	252,438	5,651	44,600			73,000	
Value.....	\$361,131	\$237,377	\$13,067	\$14,600			\$90,540	
Carbureted water gas—								
M cubic feet.....	414,166	227,926	87,000	4,746	19,918	12,158	77,034	70,261
Value.....	\$543,405	\$173,384	\$103,000	\$3,317	\$29,561	\$15,198	\$90,923	\$49,002
Mixed coal and water gas—								
M cubic feet.....	1,411,699	996,452	357,586	334,487			58,190	
Value.....	\$1,510,614	\$910,861	\$481,019	\$380,374			\$63,572	
Oil gas—								
M cubic feet.....	37,596	22,195						
Value.....	\$60,145	\$28,123						
Acetylene—								
M cubic feet.....	1,702	4,477						
Value.....	\$14,500	\$50,321						
Gasoline (cold process) gas—								
M cubic feet.....	12,854	132,883						
Value.....	\$24,903	\$170,820						
Coke:								
For sale—								
Net tons.....	18,345	22,996	4,890	8,894			5,471	
Value.....	\$116,549	\$82,536	\$31,495	\$32,930			\$43,121	
Made and consumed, tons.....	46,610		11,513				508	
Tar:								
Gallons.....	1,463,299	1,179,843	386,857	335,051			154,796	14,667
Value.....	\$58,308	\$33,117	\$18,781	\$7,092			\$8,087	\$140
All other products, value.....	\$16,235	\$37,404	\$5,918	\$31,548			\$1,410	\$1,516
Receipts from rents and sales of lamps and appliances.....	\$67,281	\$24,074	\$84	\$10,850			\$10,932	\$500
MAINS.								
Miles of mains.....	829	927	208	147	23	21	85	125

<sup>1</sup> Distribution, by states:

New England, 1919—Maine, 1 establishment; Massachusetts, 3; Connecticut, 1; 1914—Massachusetts, 4; Connecticut, 1.

Middle Atlantic, 1919—New York, 2 establishments; New Jersey, 2; Pennsylvania, 1; 1914—New York, 3; New Jersey, 1; Pennsylvania, 1.

East North Central, 1919—Ohio, 2 establishments; Indiana, 1; Illinois, 1; Michigan, 3; Wisconsin, 1; 1914—Ohio, 2; Indiana, 7; Illinois, 4; Michigan, 1; Wisconsin, 12.

\* Value of products less cost of materials.

## MANUFACTURES.

TABLE 29.—MUNICIPAL ESTABLISHMENTS: 1919 AND 1914—Continued.

	GEOGRAPHIC DIVISION.									
	West North Central.		South Atlantic.		East South Central.		Mountain (Arizona).	Pacific (California).		
	1919	1914	1919	1914	1919	1914	1919	1919	1914	1914
	20	81	15	17	2	3	1	1	1	1
Number of establishments <sup>1</sup> .....										
Number manufacturing:										
Straight coal gas.....	1	8	6	7	2	3				
Carbureted water gas.....	7	8	6	4						
Mixed coal and water gas.....			2	1						
Oil gas.....	2	14	1	5						
Acetylene.....	10	56								
Gasoline (cold process) gas.....										
Number operating gas and electric light and power plants in conjunction.....	4	2	3	5		1	1	1	1	1
Persons engaged.....	40	88	258	184	19	23	7	7	4	
Salaried employees.....	9	12	24	35	2	6	2	4	2	
Wage earners (average number).....	31	76	234	149	17	17	5	3	2	
Primary horsepower.....	1,203	975	853	746	2	14	90	20	30	
Capital.....	\$330,922	\$151,042	\$3,300,341	\$3,089,083	\$223,000	\$223,948	\$65,000	\$47,946	\$49,637	
Salaries and wages.....	\$30,127	\$18,531	\$325,616	\$134,009	\$13,660	\$13,804	\$5,990	\$5,015	\$5,408	
Salaries.....	\$3,287	\$3,928	\$36,135	\$29,514	\$2,070	\$4,233	\$1,050	\$2,192	\$1,008	
Wages.....	\$30,840	\$14,603	\$289,481	\$104,495	\$11,590	\$9,571	\$4,940	\$2,523	\$2,400	
Cost of materials.....	\$57,968	\$150,584	\$760,355	\$300,399	\$22,869	\$13,796	\$18,177	\$12,929	\$4,115	
Value of products.....	\$137,798	\$217,230	\$1,532,095	\$887,736	\$43,128	\$38,829	\$42,356	\$23,789	\$14,495	
Value added by manufacture <sup>2</sup> .....	\$49,830	\$36,646	\$771,740	\$567,337	\$20,259	\$25,033	\$24,179	\$10,560	\$10,380	
MATERIALS.										
Total cost.....	\$87,968	\$150,584	\$760,355	\$300,399	\$22,869	\$13,796	\$18,177	\$12,929	\$4,115	
Coal used for gas making:										
Net tons.....	1,670		22,247	43,805	3,310	3,638				
Cost.....	\$11,816		\$129,074	\$123,621	\$17,260	\$11,773				
Coke, purchased, used for gas making:										
Net tons.....	1,308	1,155	4,092	2,135						
Cost.....	\$12,527	\$8,553	\$46,738	\$10,890						
Oil used for gas making and enriching:										
Gallons.....	292,706	229,618	3,500,710	2,429,057			216,000	277,800	147,546	
Cost.....	\$34,218	\$9,773	\$276,133	\$125,039			\$14,476	\$9,692	\$2,344	
Gasoline for gas making:										
Gallons.....	42,401	592,992								
Cost.....	\$14,926	\$101,813								
Calcium carbide:										
Pounds.....	28,400	476,875	24,000	192,000						
Cost.....	\$1,404	\$15,260	\$1,320	\$6,166						
Fuel for boilers and retorts, cost.....	\$7,154	\$8,066	\$10,678	\$15,406		\$50				
Amount paid for lamps and appliances, purchased for sale.....		\$791	\$53,996	\$7,104	\$1,224	\$422				
All other materials, cost.....	\$5,923	\$8,298	\$262,366	\$11,273	\$4,385	\$1,551	\$3,701	\$3,237	\$1,171	
PRODUCTS.										
Total value.....	\$137,798	\$217,230	\$1,532,095	\$887,736	\$43,128	\$38,829	\$42,356	\$23,789	\$14,495	
Gas:										
M cubic feet.....	82,019	142,617	1,358,119	941,338	26,108	41,137	21,178	16,418	13,624	
Value.....	\$134,051	\$215,173	\$1,408,715	\$906,335	\$32,662	\$31,743	\$42,356	\$23,789	\$13,624	
Straight coal gas—										
M cubic feet.....	13,260		189,943	166,701	26,108	41,137				
Value.....	\$10,888		\$204,074	\$161,034	\$32,662	\$31,743				
Carbureted water gas—										
M cubic feet.....	58,192	29,205	172,022	111,556						
Value.....	\$90,712	\$41,047	\$235,200	\$61,730						
Mixed coal and water gas—										
M cubic feet.....			995,923	661,935						
Value.....			\$966,223	\$571,487						
Oil gas—										
M cubic feet.....		8,571								
Value.....		\$14,259								
Acetylene—										
M cubic feet.....	133	1,783	231	1,096						
Value.....	\$1,818	\$10,517	\$2,309	\$12,084						
Gasoline (cold process) gas—										
M cubic feet.....	10,434	103,058								
Value.....	\$21,633	\$140,350								
Coke:										
For sale—										
Net tons.....			6,846	12,626	1,138	1,476				
Value.....			\$35,230	\$45,275	\$6,733	\$4,322				
Made and consumed, tons.....	3,325		30,878		396					
Tar:										
Gallons.....			881,267	788,025	40,379	42,100				
Value.....			\$29,021	\$22,751	\$2,417	\$1,934				
All other products, value.....	\$558	\$151	\$7,257	\$3,829	\$92					\$360
Receipts from rents and sales of lamps and appliances.....	\$3,189	\$1,906	\$51,872	\$9,516	\$1,224	\$830				\$271
MAINS.										
Miles of mains.....		87	259	371	334	24	27	14	17	14

<sup>1</sup> Distribution, by states:

West North Central, 1919—Minnesota, 7 establishments; Iowa, 8; North Dakota, 1; South Dakota, 2; Nebraska, 2; 1914—Minnesota, 28; Iowa, 34; North Dakota, 1;

South Dakota, 5; Nebraska, 11; Kansas, 2.

South Atlantic, 1919—Maryland, 1 establishment; Virginia, 5; Georgia, 4; Florida, 2; North Carolina, 3; 1914—Maryland, 1; Virginia, 7; West Virginia, 1; South

Carolina, 1; Georgia, 5; Florida, 2.

East South Central, 1919—Kentucky, 1 establishment; Alabama, 1; 1914—Kentucky, 1; Alabama, 2.

<sup>2</sup> Value of products less cost of materials.

# MANUFACTURED GAS.

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## GENERAL TABLES.

Table 30 gives comparative statistics for the principal items—number of establishments, average number of wage earners, primary horsepower, wages, cost

of materials and value of products—for the census years 1919, 1914, and 1909. Table 31 is a detailed statement, by states, for the census of 1919.

TABLE 30.—COMPARATIVE SUMMARY, BY STATES: 1919, 1914, AND 1909.

STATE.	Cen-	Num-	Wage	Primary	Wages.	Cost of	Value of	STATE.	Cen-	Num-	Wage	Primary	Wages.	Cost of	Value of
United States.....	1919	1,022	42,908	238,467	\$52,759	\$157,551	\$329,279	Montana.....	1919	6	63	170	99	197	487
	1914	1,284	48,792	215,715	26,802	76,779	220,238		1914	6	59	172	58	95	266
	1909	1,296	37,215	128,350	20,931	52,428	166,814		1909	5	48	129	41	77	190
Alabama.....	1919	12	522	333	544	762	1,646	Nebraska.....	1919	20	291	1,639	328	1,134	2,446
	1914	14	214	461	129	387	1,125		1914	48	354	1,620	227	606	1,928
	1909	13	259	599	133	214	687		1909	48	400	1,015	209	445	1,415
Arizona.....	1919	9	63	590	85	350	691	New Hampshire.....	1919	13	209	298	228	529	1,195
	1914	9	59	646	41	90	267		1914	14	244	513	147	324	82
	1909	8	20	153	20	47	137		1909	14	247	220	106	180	581
California.....	1919	57	2,444	24,545	2,754	8,000	20,441	New Jersey.....	1919	38	2,083	14,757	2,375	7,375	20,317
	1914	66	2,317	22,054	2,023	3,422	13,578		1914	43	2,205	10,397	761	4,075	14,020
	1909	74	1,666	7,502	1,403	2,604	8,927		1909	47	1,917	6,717	853	2,855	9,837
Colorado.....	1910	10	448	736	565	1,001	2,649	New York.....	1919	96	8,409	51,291	10,898	41,170	69,339
	1914	8	387	1,379	303	562	1,588		1914	131	10,090	44,637	5,927	21,560	52,816
	1909	10	306	646	181	636	1,472		1909	141	6,422	30,089	4,384	15,018	42,847
Connecticut.....	1919	22	1,270	3,071	1,087	3,190	8,347	North Carolina.....	1919	22	341	1,086	329	677	1,521
	1914	27	1,209	5,089	827	1,471	4,746		1914	20	210	705	102	252	716
	1909	28	926	4,100	557	1,005	3,446		1909	14	151	398	62	123	369
Delaware.....	1919	7	145	167	186	449	1,053	North Dakota.....	1919	5	43	66	60	155	384
	1914	8	125	158	75	205	570		1914	9	52	65	29	109	273
	1909	5	128	333	76	109	364		1909	6	28	52	13	78	199
Florida.....	1919	14	418	1,074	422	983	1,989	Ohio.....	1919	15	162	822	225	358	887
	1914	14	349	968	183	338	1,049		1914	25	398	1,353	262	480	1,432
	1909	12	210	746	113	182	585		1909	38	606	2,165	431	827	3,080
Georgia.....	1919	17	486	1,344	499	1,519	3,005	Oregon.....	1919	11	334	1,910	353	818	2,927
	1914	19	560	1,999	279	653	2,021		1914	9	385	2,482	310	404	1,528
	1909	15	450	689	206	308	1,425		1909	8	260	1,483	194	200	909
Idaho.....	1919	4	35	402	41	90	241	Pennsylvania.....	1919	86	3,324	16,671	4,241	17,330	31,598
	1914	4	44	224	32	52	171		1914	99	2,798	12,552	1,420	6,440	16,745
	1909	3	35	27	27	52	113		1909	99	3,119	9,374	1,501	4,099	15,840
Illinois.....	1919	70	4,430	21,912	5,372	17,892	38,930	Rhode Island.....	1919	4	670	2,335	834	2,073	4,478
	1914	75	3,890	31,058	2,059	8,035	28,171		1914	6	605	1,731	477	884	2,462
	1909	78	6,301	18,385	2,967	6,210	21,052		1909	8	412	719	303	530	1,833
Indiana.....	1919	53	1,902	8,378	2,138	6,612	12,454	South Carolina.....	1919	10	219	950	195	474	947
	1914	60	1,068	3,707	958	2,611	6,398		1914	12	136	509	68	169	406
	1909	53	928	5,845	508	1,102	3,147		1909	12	127	207	52	114	384
Iowa.....	1919	68	727	5,316	846	2,641	5,738	South Dakota.....	1919	12	80	473	83	320	613
	1914	113	708	5,394	497	1,688	4,066		1914	17	80	651	57	136	380
	1909	117	806	2,043	380	1,111	2,893		1909	17	108	318	64	120	278
Kansas.....	1919	7	52	557	64	155	400	Tennessee.....	1919	10	474	1,868	421	811	1,801
	1914	12	62	1,644	37	66	225		1914	12	506	655	292	518	1,571
	1909	12	36	275	22	57	208		1909	11	422	613	164	357	1,282
Kentucky.....	1919	10	90	312	74	160	340	Texas.....	1919	25	643	3,622	628	1,587	3,614
	1914	13	282	1,178	131	190	589		1914	27	613	1,759	354	768	2,185
	1909	15	386	991	206	315	1,004		1900	27	575	1,090	288	545	1,644
Maine.....	1919	13	220	463	267	647	1,381	Utah.....	1919	4	172	638	196	295	790
	1914	17	220	490	152	202	789		1914	4	208	720	141	279	617
	1909	19	216	349	120	212	549		1909	3	167	291	103	168	366
Maryland.....	1919	16	875	2,881	1,272	2,858	6,448	Vermont.....	1919	9	87	136	90	222	486
	1914	18	1,284	1,677	308	1,405	4,157		1914	9	59	1,543	32	122	337
	1909	18	476	1,555	220	629	3,223		1909	9	70	153	43	100	278
Massachusetts.....	1919	51	2,654	18,827	3,557	10,774	24,231	Virginia.....	1919	17	475	1,875	667	1,457	3,150
	1914	61	3,182	11,402	2,141	5,951	15,752		1914	22	533	1,488	306	750	2,150
	1909	64	2,292	7,371	1,250	3,810	11,074		1909	21	378	1,116	217	431	1,472
Michigan.....	1919	59	2,846	13,593	3,965	8,270	17,993	Washington.....	1919	12	637	2,969	838	1,606	3,680
	1914	59	2,349	4,935	1,584	3,356	10,441		1914	18	630	2,568	487	759	2,369
	1909	55	1,771	6,055	1,096	2,129	6,748		1909	12	465	1,479	273	661	1,684
Minnesota.....	1919	23	707	5,908	860	2,408	5,518	Wisconsin.....	1919	31	1,294	7,869	1,556	3,575	8,153
	1914	47	1,038	4,670	646	1,681	4,159		1914	47	1,240	11,150	722	1,816	5,295
	1909	42	848	3,538	292	820	2,874		1909	49	1,083	3,278	583	1,399	4,001
Mississippi.....	1919	7	122	228	100	204	411	All other States.....	1919	18	1,124	4,063	1,269	3,397	7,447
	1914	8	113	196	56	111	292		1914	24	1,027	2,790	628	1,574	4,479
	1909	8	101	148	39	86	256		1909	29	1,059	2,549	595	1,100	4,053
Missouri.....	1919	26	1,318	8,772	1,539	2,096	11,113								
	1914	35	1,342	16,351	844	2,143	7,197								
	1909	29	941	3,635	636	1,223	4,638								

## MANUFACTURES.

TABLE 31.—DETAILED STATEMENT

STATE.	Number of establishments.	PERSONS ENGAGED IN THE INDUSTRY.						WAGE EARNERS DEC. 15, OR NEAREST REPRESENTATIVE DAY.			Capital,			
		Total.	Proprietors and firm members.	Salaried officers, superintendents, and managers.	Clerks, etc.		Wage earners.		16 and over.	Under 16.				
					Male.	Female.	Average number.	Number, 15th day of—						
								Maximum month.	Minimum month.					
1	United States.....	1,022	63,328	27	3,424	11,088	5,881	42,908	De 44,280 Ma 41,549	44,280	44,058	200	22	Dollars, 1,453,656,235
2	Alabama.....	12	568	18	19	9	522	De 558 Fe 66	My 496 Oc 60	558 60	558 60	.....	7,575,500 1,613,634	
3	Arizona.....	9	122	19	27	13	63	No 2,851	Fe 2,079	2,705	2,702	2	1	62,207,518
4	California.....	57	3,721	1	167	769	340	2,444	De 521 Fe 404	521	521	.....	10,973,023	
5	Colorado.....	10	528	31	36	13	418	De 1,331	No 1,229	1,249	1,225	16	8	27,214,357
6	Connecticut.....	22	1,785	109	224	182	1,270	.....	.....	.....	.....	.....	.....	
7	Delaware.....	7	219	1	21	33	19	145	Au 160 Ja 456	My 133 Je 392	141 439	140 439	1	7,728,319 10,850,130
8	Florida.....	14	509	38	35	18	418	De 341	Ja 436	495	495	1	11,103,421	
9	Georgia.....	17	663	1	47	86	43	486	De 40	Fe 31	39	39	1,981,979	
10	Idaho.....	4	58	12	7	4	35	De 4,986	Ap 4,268	4,479	4,455	44	172,854,930	
11	Illinois.....	70	7,737	252	1,072	1,053	4,430	.....	.....	.....	.....	.....	.....	
12	Indiana.....	53	2,033	1	147	329	254	1,902	Au 1,937 De 750	My 1,786 Fe 696	1,836 816	1,830 813	6 3	32,999,981 20,600,730
13	Iowa.....	68	1,052	1	101	135	88	727	Se 56	No 48	51	51	1,402,948	
14	Kansas.....	7	79	14	9	4	52	De 3,275	Fe 2,387	3,283	3,282	4	1,981,327 4,431,373	
15	Kentucky.....	10	118	15	6	7	90	Au 105	Ap 81	89	89	.....	1,981,979	
16	Maine.....	13	309	32	33	24	220	No 245	Ju 204	218	214	3	1	
17	Maryland.....	16	1,505	4	57	385	184	875	Oc 988	Ma 735	959	956	3	34,832,739
18	Massachusetts.....	51	3,314	204	179	277	2,654	Ja 2,739	Se 2,424	2,612	2,608	4	77,030,109	
19	Michigan.....	59	4,044	2	208	362	626	2,346	De 3,275	Fe 2,387	3,283	3,282	4	60,123,709
20	Minnesota.....	23	1,028	73	157	91	707	Je 783	Fe 632	734	727	7	21,461,659	
21	Mississippi.....	7	160	15	10	13	122	De 133	Ma 106	134	134	.....	1,190,879	
22	Missouri.....	26	1,866	1	106	185	256	1,318	Ja 1,419	Fe 1,265	1,307	1,302	5	51,942,192
23	Montana.....	6	89	9	14	3	63	Au 68	Ma 59	63	63	.....	1,815,948	
24	Nebraska.....	20	451	1	43	77	39	291	De 323	Fe 250	324	324	12,476,927	
25	New Hampshire.....	13	302	33	35	25	209	Se 227	Ja 190	219	212	7	3,551,515	
26	New Jersey.....	38	3,859	188	1,219	369	2,083	Ja 2,303	Ap 1,924	2,073	2,065	8	103,766,467	
27	New York.....	86	12,766	3	599	2,034	821	8,409	Ja 8,636	Se 8,076	8,440	8,380	60	447,549,070
28	North Carolina.....	22	417	34	22	20	341	Au 384	Oc 322	332	332	.....	6,617,981	
29	North Dakota.....	5	69	9	14	3	43	Oc 51	Ma 37	43	43	1,005,972		
30	Ohio.....	15	221	31	12	16	162	Ja 175	De 152	154	153	1	6,500,883	
31	Oregon.....	11	540	36	98	72	334	De 414	Ja 261	414	414	.....	14,549,796	
32	Pennsylvania.....	86	4,823	2	246	900	351	3,324	Ja 3,532	No 3,223	3,360	3,350	9	91,878,192
33	Rhode Island.....	4	906	47	88	121	670	Ja 1,001	Au 508	556	582	2	15,592,065	
34	South Carolina.....	10	303	33	30	21	219	Ma 224	Fe 215	223	223	.....	2,511,189	
35	South Dakota.....	12	124	7	14	11	80	Se 90	Ja 2	80	80	.....	1,834,545	
36	Tennessee.....	10	544	36	34	.....	474	Ju 1	Ap 487	Fe 461	475	475	1	13,546,480
37	Texas.....	25	876	1	62	108	62	643	De 693	Ja 597	688	685	2	15,404,524
38	Utah.....	4	236	11	32	21	172	Je 201	Ap 141	177	177	.....	6,566,099	
39	Vermont.....	9	137	26	12	12	87	Ja 95	Fe 81	84	84	.....	2,014,227	
40	Virginia.....	17	553	38	29	41	475	Ja 532	Ap 443	496	496	.....	9,800,819	
41	Washington.....	12	858	38	104	79	637	Oc 772	Fe 533	760	760	.....	23,986,656	
42	Wisconsin.....	34	1,749	1	104	155	195	1,294	Ju 1,351	Fe 1,174	1,304	1,297	5	32,882,014
43	All other states <sup>4</sup> .....	18	1,457	71	182	80	1,124	.....	.....	1,256	1,243	11	2	27,701,486

<sup>1</sup> Includes water wheels and turbines (irrespective of ownership of water supply), and water motors (operated by water from city mains).<sup>2</sup> Chiefly electric motors operated by rented (or purchased) current; other power included (chiefly shaft belt or transmitted power from neighboring power plants).

MANUFACTURED GAS.

27

FOR THE INDUSTRY, BY STATES: 1919.

EXPENSES.									POWER.								
Salaries and wages.			Rent and taxes.			For materials.			Value of products.	Value added by manufacture.	Primary horsepower.					Electric horsepower generated in establishments reporting.	
Officials.	Clerks, etc.	Wage earners.	For contract work.	Taxes, Federal, state, county, and local.	Principal materials.	Fuel and rent of power.	Total.	Steam engines (not turbines.)	Steam turbines.	Internal-combustion engines.	Water power. <sup>1</sup>	Rent-ed. <sup>2</sup>					
Dollars. \$,293,422	Dollars. 16,873,031	Dollars. 52,758,628	Dollars. 463,280	Dollars. 4,002,677	Dollars. 18,826,338	Dollars. 42,638,896	Dollars. 114,911,936	Dollars. 329,278,908	Dollars. 171,723,026	Dollars. 238,467	148,393	48,928	7,574	196	33,376	22,040	1
42,113	34,571	544,427	1,846	900	88,455	127,474	634,281	1,646,017	884,292	333	296				37	.....	2
18,492	47,179	84,651	.....	300	29,542	92,414	257,513	691,169	341,242	590	240	170	50	130	18	3	
493,049	1,152,856	2,754,113	.....	1,300	1,325,762	1,723,896	6,276,187	20,410,632	12,440,619	24,545	6,702	1,811	452	15,580	152	4	
69,313	49,074	565,366	1,440	41,396	112,447	888,838	2,649,135	1,648,320	730	505	37	25	169	300	5		
283,587	360,028	1,687,091	5,785	13,846	565,502	547,692	2,641,922	8,346,845	5,157,231	3,071	1,861	695	515	1,726	6		
51,976	40,980	186,037	393	.....	36,553	76,818	372,305	1,053,011	603,888	167	145	20	2	.....	7		
84,447	64,168	421,893	125	675	92,982	309,671	673,279	1,989,238	1,006,288	1,074	789	265	20	100	8		
101,385	123,342	498,461	.....	600	107,585	322,205	1,197,035	3,005,168	1,485,928	1,344	979	30	.....	335	18		
11,753	10,493	40,504	1,825	10,051	10,051	20,639	69,578	210,702	150,485	402	402	.....	51	.....	10		
780,539	3,205,556	5,372,255	104,478	347,309	1,492,015	3,178,894	14,713,288	36,930,423	19,038,261	21,912	14,869	6,187	226	630	1,133	11	
281,379	429,410	2,137,557	4,966	397,464	530,334	1,593,628	5,018,043	12,451,206	5,842,535	8,378	3,596	225	175	4,352	178	12	
181,472	217,506	846,497	.....	10,080	324,981	874,171	1,767,102	5,737,627	3,036,354	5,316	3,927	545	147	1	696	1,103	13
21,713	12,240	63,529	600	149	19,092	56,257	98,530	400,196	245,409	557	490	15	.....	52	3	14	
16,880	10,716	73,803	.....	.....	13,385	42,302	117,622	339,844	179,920	312	261	.....	51	.....	15		
63,710	56,216	286,554	7,760	.....	59,243	138,455	508,620	1,380,930	733,855	463	185	177	16	85	.....	16	
170,311	560,028	1,272,374	2,574	1,363	482,558	580,524	2,268,793	6,447,980	3,589,663	2,831	1,291	1,499	26	15	.....	17	
458,483	497,024	3,557,468	3,073	1,788,328	1,907,321	8,800,233	21,231,695	13,457,531	18,827	9,058	5,880	25	12	2,952	2,059	18	
543,947	1,139,831	3,965,259	6,510	1,620	1,247,040	2,514,834	5,755,498	17,993,314	9,722,928	13,593	10,479	1,037	1,272	805	3,149	19	
204,349	251,398	388,856	.....	2,300	308,655	658,994	1,748,827	5,517,882	3,110,061	5,908	3,024	2,330	125	429	256	20	
22,535	16,293	99,945	100	3,420	16,174	37,254	166,717	411,344	207,373	228	167	.....	61	.....	21		
208,075	382,698	1,639,087	415	3,082	617,828	553,571	2,442,547	11,113,372	8,117,254	8,772	4,210	3,253	992	317	2,099	22	
22,857	22,279	98,570	.....	.....	28,556	42,906	154,293	436,767	289,568	170	170	.....	12	.....	23		
80,679	125,124	327,894	16,055	1,460	173,700	272,438	801,895	2,445,794	1,311,461	1,639	841	305	79	1	413	24	
375,628	49,912	227,764	.....	1,468	74,586	102,684	425,335	1,194,779	665,760	298	217	.....	81	.....	25		
1,857,367	3,783,375	10,897,701	150,842	30,599	5,708,757	11,772,134	29,397,975	69,339,351	28,169,242	54,291	44,899	8,260	449	1	682	1,252	27
58,938	42,085	329,355	435	1,820	52,599	178,523	493,964	1,521,490	844,000	1,086	522	223	180	161	45	28	
17,279	15,019	60,076	845	1,342	13,088	7,373	147,836	384,467	229,258	66	56	10	.....	.....	29		
47,475	27,576	225,483	1,416	1,692	85,618	82,978	274,820	837,298	529,590	822	707	110	5	.....	30		
77,185	193,821	353,324	.....	635	231,122	214,568	603,907	2,927,374	2,108,899	1,910	293	1,540	77	2,089	31		
570,633	1,384,168	4,240,772	170	3,212,869	627,295	8,951,978	8,377,993	31,593,131	14,268,160	16,671	8,009	7,280	928	454	3,837	32	
143,103	180,461	834,074	.....	.....	247,219	186,944	1,886,093	4,477,592	2,404,555	2,335	1,215	385	735	189	33		
48,155	43,269	194,905	350	1,143	51,828	92,463	381,987	946,732	472,282	950	676	107	125	42	151	34	
31,875	24,827	82,866	.....	1,062	19,977	64,952	254,795	613,376	293,629	473	367	15	58	33	.....	35	
75,946	77,783	420,788	.....	440	161,478	138,521	707,233	1,800,579	950,825	1,868	680	133	15	1,040	4	36	
135,811	161,087	627,976	28,324	5,784	211,523	346,809	1,230,910	3,613,995	2,027,186	3,622	1,887	1,194	125	416	.....	37	
23,220	50,226	196,050	.....	10,151	50,907	81,715	213,154	789,889	495,020	638	401	86	.....	151	.....	38	
31,964	16,696	89,914	322	2,407	14,943	63,203	158,804	485,751	263,744	136	95	15	.....	26	55	39	
74,804	88,822	667,166	9,586	5	88,665	139,997	1,316,030	3,149,476	1,692,849	1,875	1,044	550	.....	275	50	40	
94,046	197,016	838,340	2,762	124	201,828	506,043	1,099,923	3,680,464	2,074,498	2,069	1,455	630	286	598	349	41	
222,386	322,382	1,556,142	52,214	.....	704,144	1,179,351	2,395,945	8,152,860	4,577,561	7,589	6,770	1,045	32	22	373	42	
170,576	257,014	1,209,307	.....	925	384,949	311,370	3,084,981	7,445,228	4,098,927	4,663	2,580	1,127	40	916	50	43	

<sup>1</sup> Same number reported for one or more other months.

<sup>2</sup> All other states embrace: Arkansas 1, establishment; District of Columbia, 2; Louisiana, 4; Nevada, 2; New Mexico, 2; Oklahoma, 2; West Virginia, 3; and Wyoming, 2.

DEPARTMENT OF COMMERCE  
BUREAU OF THE CENSUS  
WASHINGTON

FOURTEENTH CENSUS OF THE UNITED STATES  
MANUFACTURES: 1919

# MANUFACTURE OF GLASS

Prepared under the supervision of EUGENE F. HARTLEY, Chief Statistician for Manufactures

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## EXPLANATION OF TERMS.

**Scope of census.**—Census statistics of manufactures are compiled primarily for the purpose of showing the absolute and relative magnitude of the different branches of industry covered and their growth or decline. Incidentally, the effort is made to present data throwing light upon character of ownership, size of establishments, and similar subjects. When use is made of the statistics for these purposes it is imperative that due attention be given to their limitations, particularly in connection with any attempt to derive from them figures purporting to show average wages, cost of production, or profits.

The census did not cover establishments which were idle during the entire year or for which products were valued at less than \$500, or the manufacturing done in educational, eleemosynary, and penal institutions.

**Period covered.**—The returns relate to the calendar year 1919, or the business year which corresponded most nearly to that calendar year, and cover a year's operations, except for establishments which began or discontinued business during the year.

**The establishment.**—As a rule, the term "establishment" represents a single plant or factory, but in some cases it represents two or more plants which were operated under a common ownership or for which one set of books of account was kept. If, however, the plants constituting an establishment as thus defined were not all located within the same city, county, or state, separate reports were secured in order that the figures for each plant might be included in the statistics for the city, county, or state in which it was located. In some instances separate reports were secured for different industries carried on in the same establishment.

**Classification by industries.**—The establishments were assigned to the several classes of industries according to their products of chief value. The products reported for a given industry may thus, on the one hand, include minor products different from those covered by the class designation, and, on the other hand, may not represent the total product covered by this designation, because some products of this class may be made in establishments in which it is not the product of chief value.

**Influence of increased prices.**—In comparing figures for cost of materials, value of products, and value added by manufacture in 1919 with the corresponding figures for earlier censuses, account should be taken of the general increase in the prices of commodities during recent years. To the extent to which this factor has been influential the figures fail to afford an exact measure of the increase in the volume of business.

**Persons engaged in the industry.**—The following general classes of persons engaged in the manufacturing industries were distinguished: (1) Proprietors and firm members, (2) salaried officers of corporations, (3) superintendents and managers, (4) clerks (including other subordinate salaried employees), and (5) wage earners.

The number of persons engaged in each industry, segregated by sex, and, in the case of wage earners, also by age (whether under 16 or 16 and over), was reported for a single representative day. The 15th of December was selected as representing for most industries normal conditions of employment, but where this date did not portray such conditions, an earlier date was requested.

In the case of employees other than wage earners the number thus reported for the representative date has been treated as equivalent to the average for the year, since the number of employees of this class does not ordinarily vary much from month to month. In the case of wage earners the average has been obtained in the manner explained in the next paragraph.

In addition to the more detailed report by sex and age of the number of wage earners on the representative date, a report was obtained of the number employed on the 15th of each month, by sex, without distinction of age. From these figures the average number of wage earners for the year has been calculated by dividing the sum of the numbers reported for the several months by 12. The importance of the industry as an employer of labor is believed to be more accurately measured by this average than by the number employed at any one time or on a given day.

The number of wage earners reported for the representative day, though given in certain tables for each separate industry, is not totaled for all industries combined, because, in view of the variations of date, such a total is not believed to be significant. It would involve more or less duplication of persons working in different industries at different times, would not represent the total number employed in all industries at any one time, and would give an undue weight to seasonal industries as compared with industries in continual operation.

In order to determine as nearly as possible the age distribution of the average number of wage earners for an industry, the per cent distribution by age of the wage earners for December 15, or the nearest representative day, has been calculated from the actual numbers reported for that date. The percentages thus obtained have been applied to the average number of wage earners for the year to determine the average numbers 16 years and over, and under 16, employed.

**Salaries and wages.**—Under these heads are given the total payments during the year for salaries and wages, respectively. The Census Bureau has not undertaken to calculate the average annual earnings of either salaried employees or wage earners. Such averages would possess little real value, because they would be based on the earnings of employees of both sexes, of all ages, and of widely varying degrees of skill. Furthermore, so far as wage earners are concerned, it would be impossible to calcu-

late accurately even so simple an average as this, since the number of wage earners fluctuates from month to month in every industry, and in some cases to a very great extent. The Census Bureau's figures for wage earners, as already explained, are averages based on the number employed on the 15th of each month, and while representing the number according to the pay rolls to whom wages were paid on that date, no doubt represent a larger number than would be required to perform the work in any industry if all were continuously employed during the year.

**Prevailing hours of labor.**—No attempt was made to ascertain the number of wage earners working a given number of hours per week. The inquiry called merely for the prevailing practice followed in each establishment. Occasional variations in hours in an establishment from one part of the year to another were disregarded, and no attention was paid to the fact that a few wage earners might have hours differing from those of the majority. All the wage earners of each establishment are therefore counted in the class within which the establishment itself falls. In most establishments, however, practically all the wage earners work the same number of hours, so that the figures give a substantially correct representation of the hours of labor.

**Capital (amount actually invested).**—The instructions on the schedule for securing data relating to capital were as follows:

"The answer should show the total amount of capital, both owned and borrowed, on the last day of the business year reported. All the items of fixed and live capital may be taken at the amounts carried on the books. If land or buildings are rented, that fact should be stated and no value given. If a part of the land or buildings is owned, the remainder being rented, that fact should be so stated and only the value of the owned property given. Do not include securities and loans representing investments in other enterprises."

These instructions were identical with those employed at the census of 1910 and 1900. The data compiled in respect to capital, however, at both censuses, as well as at all preceding censuses of manufactures, have been so defective as to be of little value except as indicating general conditions. In fact, it has been repeatedly recommended by the census authorities that this inquiry be omitted from the schedule. While there are some establishments whose accounting systems are such that an accurate return for capital could be made, this is not true of the great majority, and the figures therefore do not show the actual amount of capital invested.

**Materials.**—The statistics as to cost of materials relate to the materials used during the year, which may be more or less than the materials purchased during the year. The term "materials" covers fuel, rent of power and heat, mill supplies, and containers, as well as materials which form a constituent part of the product.

**Rent and taxes.**—The taxes include certain Federal taxes and state, county, and local taxes. Under "Federal taxes" there are included the internal revenue tax on manufactures (tobacco, beverages, etc.), excise taxes when included in values reported for products, corporation capital stock tax, and corporation income tax, but not the income tax for individuals and partners.

**Value of products.**—The amounts given under this heading represent the selling value or price at the factory of all products manufactured during the year, which may differ from the value of the products sold.

**Value added by manufacture.**—The value of products is not always a satisfactory measure of either the absolute or the relative importance of a given industry, because only a part of this value is actually created by the manufacturing processes carried on in the industry itself. Another part, and often by far the larger one, represents the value of the materials used. For many purposes, therefore, the best measure of the importance of an industry, from a manufacturing standpoint, is the value created by the manufacturing operations carried on within the industry. This value is calculated by deducting the cost of the materials used from the value of the products. The figure thus obtained is termed in the census reports "value added by manufacture."

**Cost of manufacture and profits.**—The census data do not show the entire cost of manufacture, and consequently can not be used for the calculation of profits. No account has been taken of depreciation or interest, rent of offices and buildings other than factory or works, insurance, ordinary repairs, advertising, and other sundry expenses.

**Primary horsepower.**—This item represents the total primary power equipment of the manufacturing establishments plus the amount of power, principally electric, rented from other concerns. It does not cover the power of electric motor taking their current from dynamos driven by primary power machines operated by the same establishment, because the inclusion of such power would obviously result in duplication. The figures for primary horsepower represent the rated capacity of the engines, motors, etc., and not the amount of power in actual daily use.

**Fuel.**—Statistics of the quantity of fuel used are shown only for anthracite and bituminous coal, coke, fuel oils, gasoline and other volatile oils, and gas, and represent the quantity used during the year. As only the principal kinds of fuel are shown, comparison as to the total cost of all fuel is impracticable.

# MANUFACTURE OF GLASS.

## GENERAL STATISTICS.

General character of the industry.—This industry embraces all establishments engaged in the manufacture of glass from raw materials, but does not include those engaged primarily in glass beveling, bending sheet glass, engraving glass, making glass labels, staining and ornamenting glass, or making glassware from purchased "blanks." It does, however, cover the reworking of glass when done by the establishment in which the glass is manufactured.

The establishments in this industry are engaged in the manufacture of (1) building glass, which includes window glass, plate glass, and all varieties of cast and rolled glass; (2) pressed and blown glass, such as tableware, jelly glasses, tumblers, goblets, bar goods, lamps, chimneys, lantern globes, electric bulbs, shades, globes, and other gas and electric goods, opal ware, cut ware, decorated glassware and tubing; (3) bottles, jars, druggists' wares, demijohns, etc.

Importance and growth of the industry.—Table 1 presents the statistics for each census since 1879, with percentages of increase for each census period.

With few exceptions, increases are noticeable at each succeeding census. The large increases, however, from 1914 to 1919, in salaries and wages, cost of materials, and value of products are due largely to the general rise of prices and wages following the World War, and do not, therefore, fairly measure the growth of the industry for that period. The addition of the Federal income tax since 1919 accounts for the large increase in "Rent and taxes."

States, ranked by value of products.—Table 2 summarizes the more important statistics of the industry by states, the states being arranged according to the value of products reported for 1919.

The major portion of the glass manufactured in the United States is made in the factories in the four adjoining states of Pennsylvania, West Virginia, Ohio, and Indiana. These states reported for 1919, 69.5 per cent of the establishments, 69.1 per cent of the wage earners, and 72 per cent of the value of products.

Pennsylvania was the most important state in the industry, producing 30.7 per cent of all the glass manufactured in the United States. West Virginia ranked second; Ohio, third; and Indiana, fourth.

Persons engaged in the industry.—The classification by age of the average number of wage earners in Table 3 is an estimate obtained by the method described in the "Explanation of terms." The classification by sex for 1919 was reported separately, but for 1914 and 1909 was obtained in the same manner as the classification by age. Figures for individual states will be found in Table 15.

Wage earners, by months.—As shown by Table 4, the number of wage earners employed in the industry ranged from a maximum of 85,416 in November to a minimum of 65,055 in July, the minimum number being equivalent to 76.2 per cent of the maximum. Figures for the principal states are given separately for 1919, while for the United States a segregation of sex is given for 1919 and males and females combined for 1919, 1914, and 1909.

Prevailing hours of labor.—Table 5 shows a marked shortening of the working day for the industry since 1914. In that year, 53.9 per cent of the wage earners were reported as employed fewer than 54 hours per week as against 80.2 per cent in 1919. In 1914 the "60" and "Over 60" groups constituted 20.8 per cent of the total number of wage earners, as compared with 6.9 per cent in 1919.

Size of establishments, by average number of wage earners.—Table 6 shows that 275 establishments, or 74.1 per cent of the total number for the industry, were in the several classes having fewer than 251 wage earners, while such establishments employed but 36.1 per cent of the total number of wage earners. On the other hand, the establishments employing an average of more than 250 wage earners represented only 25.9 per cent of the total number of establishments, but reported 63.9 per cent of the total number of wage earners.

Size of establishments, by value of products.—At the censuses of 1909 and 1914 establishments with products valued at "\$100,000 to \$1,000,000" constituted one group, but at the census of 1919 this group was subdivided into "\$100,000 to \$500,000" and "\$500,000 to \$1,000,000." Separate figures for the number of establishments and value of products have been compiled, however, from the returns for 1914. Table 7, therefore, gives combined figures for these two groups in the case of all items for 1909, and in the case of average number of wage earners and value added by manufacture for 1914. The statistics in this table show the degree of concentration of production in large establishments. In 1919 the groups "\$500,000 to \$1,000,000" and "\$1,000,000 and over" included 139 establishments, or 37.5 per cent of the total number for the industry, but employed 56,533 wage earners, or 72.9 per cent of the total average number, and reported products to the value of \$208,553,025, or 79.6 per cent of the total value of products.

Character of ownership.—Table 8 emphasizes the predominance of the corporate form of ownership. Corporations owned 92.2 per cent of the total number of establishments in the industry in 1919, employed

## MANUFACTURES.

97.4 per cent of the total average number of wage earners, and reported 98 per cent of the total value of products. During the five-year period 1914 to 1919 the average number of wage earners in corporations increased 4,332, or 6.1 per cent, and the value of products \$137,662,585, or 115.7 per cent.

**Number and horsepower of types of prime movers.**—From 1914 to 1919, as shown by Table 9, there was an increase in the total horsepower for the industry of 44,291 horsepower, or 27.1 per cent. This increase,

however, is chiefly due to the gain of 38,527 horsepower, or 267 per cent, in rented power. The owned power increased only 5,764 horsepower, or 3.9 per cent.

**Fuel consumed.**—Table 10 shows, by states, the principal kinds of fuel used in the industry in 1919 and 1914. Of the totals for the principal kinds of fuel used in the industry in 1919, Pennsylvania reported 25.2 per cent of the bituminous coal, 14.1 per cent of the fuel oils, and 41.4 per cent of the gas.

TABLE 1.—COMPARATIVE SUMMARY: 1919, 1914, 1909, 1904, 1899, 1889, AND 1879.

	1919	1914	1909	1904	1899	1889	1879	PER CENT OF INCREASE, <sup>1</sup>					
								1914-1919	1909-1914	1904-1909	1899-1904	1889-1899	1879-1889
Number of establishments.....	371	348	363	399	355	294	169	6.6	-4.1	-9.0	12.4	20.7	74.0
Persons engaged.....	83,656	78,804	72,573	67,105	(2)	(2)	(2)	6.2	8.6	8.1	(2)	.....	.....
Proprietors and firm members.....	60	93	87	96	(2)	(2)	(2)	-35.5	6.9	-9.4	(2)	.....	.....
Salaried employees.....	6,076	4,209	3,575	3,040	2,268	(2)	(2)	44.4	17.7	17.6	34.0	.....	.....
Wage earners (average number).....	77,520	74,602	68,911	63,869	52,818	44,892	24,177	4.1	8.1	7.7	21.1	17.7	(9)
Primary horsepower.....	207,430	163,139	123,132	91,476	52,943	28,241	5,672	27.1	32.5	34.6	72.8	87.5	907.9
Capital.....	\$215,680,436	\$153,925,876	\$129,288,384	\$89,389,151	\$61,423,303	\$40,960,850	\$18,804,599	40.1	19.1	44.6	45.5	49.9	117.9
Salaries and wages.....	100,891,194	55,204,723	44,293,215	41,228,441	29,877,086	22,118,522	9,144,100	82.8	24.6	7.4	38.0	35.1	141.9
Salaries.....	13,384,569	6,548,904	4,993,591	3,940,293	2,792,376	(2)	(2)	104.1	31.1	26.7	41.1	.....	.....
Wages.....	87,526,625	48,655,819	39,299,024	37,288,148	27,084,710	(2)	(2)	79.9	23.8	5.4	37.7	.....	.....
Paid for contract work.....	240,750	150,185	85,864	56,848	59,959	(2)	(2)	60.3	74.9	51.0	-3.6	.....	.....
Rent and taxes.....	10,003,005	882,222	508,533	4357,121	4,265,583	(2)	(2)	1,033.8	74.2	41.8	34.5	.....	.....
Cost of materials.....	90,780,124	46,016,504	32,119,499	28,145,622	16,731,009	12,140,985	8,028,621	97.3	43.3	22.8	50.3	37.8	51.2
Value of products.....	261,884,080	123,085,019	92,095,203	78,607,998	56,539,712	41,051,004	21,154,571	112.8	33.6	15.7	40.8	37.7	94.1
Value added by manufacture <sup>2</sup> .....	171,103,956	77,068,615	59,975,704	53,402,476	39,808,703	28,910,019	13,125,950	122.0	28.5	12.2	34.3	37.7	120.3

<sup>1</sup> A minus sign (—) denotes decrease.<sup>2</sup> Figures not available.<sup>3</sup> Figures not strictly comparable.<sup>4</sup> Exclusive of internal revenue.<sup>5</sup> Value of products less cost of materials.

TABLE 2.—PRINCIPAL STATES, RANKED BY VALUE OF PRODUCTS: 1919.

STATE.	NUMBER OF ESTABLISHMENTS	WAGE EARNERS.			VALUE OF PRODUCTS.		VALUE ADDED BY MANUFACTURE.		STATE.	WAGE EARNERS.			VALUE OF PRODUCTS.		VALUE ADDED BY MANUFACTURE.						
		Average number.	Per cent distribution.	Rank.	Amount (expressed in thousands).	Per cent distribution.	Rank.	Amount (expressed in thousands).	Per cent distribution.	Average number.	Per cent distribution.	Rank.	Amount (expressed in thousands).	Per cent distribution.	Rank.						
United States	371	77,520	100.0	....	\$261,884	100.0	....	\$171,104	100.0	....	New Jersey.....	21	5,942	7.7	5	\$13,695	5.2	6	\$9,249	5.4	6
Pennsylvania.....	102	21,602	27.9	1	80,480	30.7	1	52,822	30.9	1	New York.....	19	3,929	5.1	7	12,998	5.0	7	8,951	5.2	7
West Virginia.....	77	11,668	15.0	2	42,730	16.3	2	28,929	16.9	2	Missouri.....	4	2,034	2.6	8	6,927	2.6	8	4,367	2.6	8
Ohio.....	44	10,935	14.1	3	35,241	13.5	3	22,588	13.2	3	Oklahoma.....	18	1,692	2.2	10	4,751	1.8	9	2,839	1.7	10
Indiana.....	35	9,350	12.1	4	30,107	11.5	4	16,952	9.9	4	Maryland.....	8	1,753	2.3	9	4,032	1.5	10	2,933	1.7	9
Illinois.....	14	4,065	5.2	6	18,245	7.0	5	12,685	7.4	5	California.....	7	1,333	1.7	11	3,761	1.4	11	2,435	1.4	11
Kansas.....											Kansas.....	5	584	0.8	13	2,133	0.8	12	1,527	0.9	12
Virginia.....											Virginia.....	4	641	0.8	12	831	0.3	15	500	0.3	15
All other states.....											All other states.....	15	1,990	2.6	....	5,955	2.3	....	4,267	2.5	....

TABLE 3.—PERSONS ENGAGED IN THE INDUSTRY: 1919, 1914, AND 1909.

CLASS.	CENSUS YEAR.	TOTAL.	MALE.	FEMALE.	PER CENT OF TOTAL.		CLASS.	CENSUS YEAR.	TOTAL.	MALE.	FEMALE.	PER CENT OF TOTAL.	
					MALE.	FEMALE.						MALE.	FEMALE.
All classes.....	1919	83,656	72,647	11,003	86.8	13.2	Clerks and other subordinate salaried employees.....	1919	3,838	2,042	1,595	56.1	43.9
	1914	78,804	73,243	5,561	92.9	7.1		1914	2,824	2,026	798	71.7	28.3
	1909	72,573	67,811	4,762	93.4	6.6		1909	2,288	1,616	670	70.7	29.3
Proprietors and officials.....	1919	2,498	2,465	33	98.7	1.3	Wage earners (average number).....	1919	77,520	68,140	9,380	87.9	12.1
	1914	1,478	1,460	18	97.8	2.2		1914	74,502	69,757	4,745	93.6	6.4
	1909	1,376	1,368	10	99.3	0.7		1909	68,911	64,829	4,082	94.1	5.9
Proprietors and firm members.....	1919	60	56	4	93.3	6.7	16 years of age and over.....	1919	76,107	66,973	9,134	88.0	12.0
	1914	93	91	2	97.8	2.2		1914	72,510	63,085	4,425	83.9	6.1
	1909	87	82	5	94.3	5.7		1909	65,350	61,639	3,711	94.3	5.7
Salaried officers of corporations.....	1919	706	689	17	97.6	2.4	Under 16 years of age.....	1919	1,413	1,167	246	82.6	17.4
	1914	517	505	12	97.7	2.3		1914	1,092	1,072	371	93.6	6.4
	1909	479	475	4	99.2	0.8		1909	3,561	3,190	371	89.6	10.4
Superintendents and managers.....	1919	1,732	1,720	12	99.3	0.7							
	1914	868	864	4	99.5	0.5							
	1909	810	809	1	99.9	0.1							

TABLE 4.—WAGE EARNERS, BY MONTHS, FOR SELECTED STATES: 1919.

[The month of maximum employment for each industry is indicated by bold-faced figures and that of minimum employment by *italic* figures.]

STATE.	Average number employed during year.	NUMBER EMPLOYED ON 15TH DAY OF THE MONTH OR NEAREST REPRESENTATIVE DAY.												Percent minimum is of maximum.
		January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	
United States:														
1919.....	77,520	74,571	78,413	70,603	79,450	78,191	74,719	65,055	68,993	78,072	83,190	85,416	84,477	76.2
Males.....	68,140	65,438	69,132	70,234	70,003	68,704	65,236	57,184	60,731	68,575	73,194	75,037	74,232	76.2
Females.....	9,380	9,133	9,281	9,459	9,447	9,457	9,483	7,891	8,262	9,497	9,996	10,378	10,245	76.0
1914.....	74,502	83,002	85,875	88,461	85,644	82,073	74,347	55,433	49,861	62,683	72,075	77,383	78,287	87.7
1909.....	68,911	72,031	75,720	78,921	77,692	70,550	73,038	40,222	43,839	50,127	71,746	78,454	81,685	49.3
California.....	1,333	1,512	1,466	1,468	1,450	1,461	1,212	951	1,082	1,368	1,781	1,654	33.2	
Illinois.....	4,065	4,260	4,291	4,196	4,249	4,024	4,086	4,014	3,957	4,027	3,946	3,905	3,825	89.1
Indiana.....	9,350	9,908	10,020	9,803	9,454	9,366	9,188	7,884	7,860	9,002	10,004	10,492	9,219	74.9
Kansas.....	584	396	656	699	717	669	194	199	370	512	821	780	686	23.6
Maryland.....	1,755	1,609	1,656	1,713	1,866	1,784	1,875	1,749	1,252	1,833	1,878	1,943	1,902	64.4
Missouri.....	2,034	2,025	2,029	2,299	2,243	2,162	2,148	1,692	1,663	1,850	1,972	2,191	2,134	72.3
New Jersey.....	5,942	6,574	5,909	6,076	6,274	6,171	6,120	5,045	4,488	5,089	6,152	6,565	6,811	65.9
New York.....	3,929	4,190	4,214	4,245	4,139	3,973	3,991	2,695	3,322	3,675	4,062	4,210	4,432	60.8
Ohio.....	10,935	9,851	10,961	11,094	11,517	11,177	10,943	9,077	10,239	10,818	11,516	11,042	12,085	75.1
Oklahoma.....	1,602	1,303	2,142	2,235	2,287	1,971	1,400	887	1,033	1,502	1,713	1,653	2,068	43.0
Pennsylvania.....	21,149	20,602	20,607	20,490	20,477	20,349	20,496	18,809	20,558	23,389	24,283	24,944	24,673	75.4
Virginia.....	641	524	525	638	660	692	700	593	644	670	670	684	74.9	
West Virginia.....	11,668	10,448	11,681	12,178	11,572	11,784	10,387	9,554	11,807	12,459	12,854	12,599	12,743	74.3

TABLE 5.—AVERAGE NUMBER OF WAGE EARNERS, BY PREVAILING HOURS OF LABOR PER WEEK, FOR SELECTED STATES: 1919 AND 1914.

STATE.	Census year.	Total.	IN ESTABLISHMENTS WHERE THE PREVAILING HOURS OF LABOR PER WEEK WERE—								
			44 and under.	Between 44 and 48.	48. <sup>1</sup>	Between 48 and 54.	54.	Between 54 and 60.	60.	Over 60.	
United States.....	1919	77,520	14,098	7,174	26,098	14,815	5,818	4,143	4,603	771	
	1914	74,502	(*)	(*)	12,205	27,975	11,394	7,458	10,743	4,727	
	1909	68,911	(*)	(*)	11,358	16,603	8,707	13,923	10,764	7,556	
California.....	1919	1,333	500	(*)	833	-----	25	-----	-----	-----	
	1914	1,084	(*)	(*)	203	856	-----	-----	-----	-----	
Illinois.....	1919	4,065	1,828	277	1,513	7	440	-----	-----	-----	
	1914	3,764	(*)	(*)	180	1,203	663	1,398	320	-----	
Indiana.....	1919	9,250	1,725	386	2,985	1,804	629	-----	1,821	-----	
	1914	9,390	(*)	(*)	590	3,361	2,290	1,241	1,908	-----	
Maryland.....	1919	1,755	91	91	933	216	424	-----	-----	-----	
	1914	1,184	(*)	(*)	140	937	107	-----	-----	-----	
Missouri.....	1919	2,034	(*)	(*)	325	1,525	184	-----	-----	1,754	
	1914	2,248	(*)	(*)	11	448	35	-----	-----	-----	
New Jersey.....	1919	5,942	1,136	744	942	2,044	822	83	171	-----	
	1914	5,784	(*)	(*)	864	3,602	918	-----	151	249	
New York.....	1919	3,920	204	14	767	425	217	2,302	-----	56	
	1914	3,089	(*)	(*)	344	882	700	1,107	-----	-----	
Ohio.....	1919	10,935	1,197	2,723	3,780	1,471	916	783	65	-----	
	1914	10,997	(*)	(*)	784	4,515	2,916	198	2,276	308	
Oklahoma.....	1919	1,692	258	126	1,241	67	-----	-----	-----	-----	
	1914	1,270	(*)	(*)	856	156	258	-----	-----	-----	
Pennsylvania.....	1919	21,602	4,002	1,172	7,905	5,104	1,146	503	1,361	409	
	1914	23,606	(*)	(*)	4,494	7,235	2,734	2,114	2,859	4,170	
Virginia.....	1919	641	-----	222	303	-----	116	-----	-----	-----	
	1914	606	(*)	(*)	163	343	100	-----	-----	-----	
West Virginia.....	1919	11,668	2,662	1,321	4,437	1,167	641	402	676	362	
	1914	8,889	(*)	(*)	2,315	3,931	532	983	1,128	-----	

<sup>1</sup> Includes 48 and under for 1914 and 1909.<sup>2</sup> Corresponding figures not available.

## MANUFACTURES.

TABLE 6.—SIZE OF ESTABLISHMENTS, BY AVERAGE NUMBER OF WAGE EARNERS, FOR SELECTED STATES: 1919.

STATE.	TOTAL.		ESTABLISHMENTS EMPLOYING—																						
	Establishments.	Wage earners (average number).	1 to 5 wage earners, inclusive.			6 to 20 wage earners, inclusive.			21 to 50 wage earners, inclusive.			51 to 100 wage earners, inclusive.			101 to 250 wage earners, inclusive.			251 to 500 wage earners, inclusive.			501 to 1,000 wage earners, inclusive.				
			Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.	
United States..... 1919.....	371	77,520	8	27	21	303	39	1,436	86	6,362	121	19,891	65	22,137	23	14,424	8	12,940	.....	.....	.....	.....	.....	12,940	7,652
1914.....	348	74,502	5	16	17	251	31	1,096	72	5,542	126	20,060	68	23,706	23	16,179	6	12,700	.....	.....	.....	.....	.....	12,700	7,652
California.....	7	1,333	1	3	2	22	2	57	1	56	3	500	1	773	1	599	1	1,760	.....	.....	.....	.....	.....	1,760	1,760
Illinois.....	14	4,005	2	5	2	1	31	1	198	3	480	3	1,102	1	599	1	1,271	3	2,070	1	1,271	1	1,271	1	1,271
Indiana.....	35	9,350	.....	.....	3	39	.....	.....	3	198	16	2,981	9	2,791	1	2,791	1	2,791	1	2,791	1	2,791	1	2,791	
Maryland.....	8	1,755	.....	.....	1	14	.....	.....	2	183	2	364	2	625	1	569	1	569	1	569	1	569	1	569	
Missouri.....	4	2,034	.....	.....	2	25	3	116	2	142	4	402	7	2,493	2	1,107	1	1,525	1	1,525	1	1,525	1	1,525	
New Jersey.....	21	5,942	.....	.....	2	30	4	125	5	388	6	831	1	2,74	1	1,457	1	1,457	1	1,457	1	1,457	1	1,457	
New York.....	19	3,929	.....	.....	1	17	1	43	11	796	14	2,154	11	4,015	6	3,910	1	2,281	1	2,281	1	2,281	1	2,281	
Ohio.....	44	10,935	.....	.....	1	45	13	470	20	1,441	25	3,826	9	2,880	5	2,999	3	4,646	3	4,646	3	4,646	3	4,646	
Oklahoma.....	16	1,692	1	4	1	29	6	424	8	1,235	30	4,929	21	7,248	4	2,397	3	4,646	3	4,646	3	4,646	3	4,646	
Pennsylvania.....	102	21,602	2	8	6	99	12	479	24	1,796	30	4,929	21	7,248	4	2,397	3	4,646	3	4,646	3	4,646	3	4,646	
Virginia.....	4	641	2	7	3	45	13	470	20	1,441	25	3,826	9	2,880	5	2,999	3	4,646	3	4,646	3	4,646	3	4,646	
West Virginia.....	77	11,668	2	7	3	45	13	470	20	1,441	25	3,826	9	2,880	5	2,999	3	4,646	3	4,646	3	4,646	3	4,646	

TABLE 7.—SIZE OF ESTABLISHMENTS, BY VALUE OF PRODUCTS: 1919, 1914, AND 1909.

VALUE OF PRODUCT.	NUMBER OF ESTABLISHMENTS.			AVERAGE NUMBER OF WAGE EARNERS.			• VALUE OF PRODUCTS.			VALUE ADDED BY MANUFACTURE.			
	1919	1914	1909	1919	1914	1909	1919	1914	1909	1919	1914	1909	
	1919	1914	1909	1919	1914	1909	1919	1914	1909	1919	1914	1909	
All classes.....	371	348	363	77,520	74,502	68,911	\$261,884,080	\$123,085,019	\$92,095,203	\$171,103,956	\$77,068,515	\$59,975,704	
Less than \$20,000.....	13	17	24	114	243	209	159,539	169,911	171,970	71,677	95,552	111,629	
\$20,000 to \$100,000.....	33	52	91	874	2,424	4,647	1,950,021	3,306,884	5,691,849	1,133,066	2,157,023	3,751,933	
\$100,000 to \$500,000.....	186	210	238	{ 19,909 }	{ 52,620 }	{ 53,931 }	{ 51,221,495 }	{ 48,813,320 }	{ 69,534,919 }	{ 34,381,173 }	{ 51,295,824 }	{ 45,377,554 }	
\$500,000 to \$1,000,000.....	70	46	10	{ 16,723 }	{ 19,215 }	{ 10,124 }	{ 49,235,395 }	{ 30,110,455 }	{ 40,684,449 }	{ 16,696,465 }	{ 20,1 }	{ 66,6 }	{ 75,7 }
\$1,000,000 and over.....	69	23	10	{ 39,810 }	{ 19,215 }	{ 159,817,630 }	{ 40,684,449 }	{ 40,684,449 }	{ 16,696,465 }	{ 103,420,750 }	{ 23,520,116 }	{ 10,734,688 }	{ 17,9 }
PER CENT DISTRIBUTION.													
All classes.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
Less than \$20,000.....	3.5	4.9	6.6	0.1	0.3	0.3	0.1	0.1	0.2	(1)	0.1	0.2	
\$20,000 to \$100,000.....	8.9	14.9	25.1	1.1	3.3	6.7	0.7	2.7	6.2	0.7	2.8	6.3	
\$100,000 to \$500,000.....	50.1	60.3	65.6	{ 25.8 }	{ 21.6 }	{ 70.6 }	{ 19.6 }	{ 39.6 }	{ 75.5 }	{ 20.1 }	{ 66.6 }	{ 75.7 }	
\$500,000 to \$1,000,000.....	18.9	13.3	2.8	51.4	25.8	14.7	18.8	24.5	18.1	18.8	60.4	30.5	
\$1,000,000 and over.....	18.6	6.6	2.8	51.4	25.8	14.7	60.8	33.1	18.1	60.4	30.5	17.9	

<sup>1</sup> Less than one-tenth of 1 per cent.

TABLE 8.—CHARACTER OF OWNERSHIP: 1919 AND 1914.

CHARACTER OF OWNERSHIP.	Cen-	Num-	Wage	Value	Value	CHARACTER OF OWNERSHIP.	Cen-	Num-	Wage	Value	Value	
year.	estab-	lish-	average	products.	added by manufac-	year.	estab-	lish-	average	products.	added by manufac-	
United States.....	1919	371	77,520	\$261,884,080	\$171,103,956	Individual.....	1919	3.2	0.8	0.7	0.7	0.7
1914	348	74,502	123,085,019	77,068,515	1914	3.4	1.0	1.0	0.7	0.7	0.8	
1909	363	68,911	92,095,203	59,975,704	Corporation.....	1919	92.2	97.4	98.0	98.0	97.8	
Individual.....	1919	12	618	1,795,048	1,182,286	1914	89.9	95.5	96.7	96.7	96.2	
1914	12	770	892,901	596,735	All other.....	1919	4.6	1.8	1.3	1.3	1.5	
Corporation.....	1919	342	75,468	256,643,158	167,380,720	1914	6.6	3.5	2.6	2.6	3.0	
1914	313	71,136	118,980,573	74,165,662								
All other.....	1919	17	1,434	3,445,874	2,540,950							
1914	23	2,596	3,211,455	2,306,118								

## GLASS.

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TABLE 9.—NUMBER AND HORSEPOWER OF TYPES OF PRIME MOVERS: 1919, 1914, AND 1909.

POWER.	NUMBER OF ENGINES OR MOTORS.			HORSEPOWER.					
	1919	1914	1909	Amount.			Per cent distribution.		
				1919	1914	1909	1919	1914	1909
Primary power, total .....	4,431	2,290	1,428	207,430	163,139	123,132	100.0	100.0	100.0
Owned .....	1,034	1,051	1,122	154,474	148,710	119,707	74.5	91.2	97.2
Steam <sup>1</sup> .....	435	661	765	99,140	105,061	98,971	47.8	64.4	80.4
Engines .....	411	(2)	(2)	80,715	(2)	(2)	38.9	(2)	(2)
Turbines .....	24	(2)	(2)	18,425	(2)	(2)	8.9	(2)	(2)
Internal-combustion engines .....	371	385	350	52,877	43,448	20,731	25.5	26.6	16.8
Water .....	228	5	1	2,457	201	5	1.2	0.1	(2)
Water wheels and turbines .....	227	4	—	2,452	200	—	1.2	0.1	—
Water motors .....	1	1	1	5	1	5	(2)	(2)	(2)
Rented .....	3,397	1,230	306	52,956	14,429	8,425	25.5	8.8	2.8
Electric .....	3,397	1,230	306	52,864	14,224	8,425	25.5	8.7	2.8
Other .....	—	—	92	5	—	(2)	(2)	—	—
Electric .....	9,720	6,018	2,510	143,125	92,896	43,589	100.0	100.0	100.0
Rented .....	3,397	1,230	306	52,864	14,224	3,425	37.0	15.3	7.9
Generated by establishments reporting .....	6,323	4,770	2,204	90,261	78,872	40,164	63.0	84.7	92.1

Figures for horsepower include for 1909 the amount reported under the head of "Other" owned power. <sup>2</sup> Not reported separately. <sup>3</sup> Less than one-tenth of 1 per cent.

TABLE 10.—FUEL CONSUMED, BY SELECTED STATES: 1919 AND 1914.

STATE.	Cen-	COAL.		Gaso-	Gas-	STATE.	Cen-	COAL.		Gaso-	Gas-	year.	ite	COAL.		Gaso-	Gas-	oline	oline	oline																			
		An-	bitum-	coke	fuel			An-	bitum-	coke	fuel		ite	thru-	an-	bitum-	tons,	tons,	tons,	oils	and	other	feet).	year.	ite	tons,	tons,	tons,	barrels)	other	other	feet).							
United States.....	1919	15,268	2,643,654	131,998	895,984	14,135	38,500,857	New Jersey.....	1919	2,556	163,002	2,296	134,943	280	45,245	1914	3,793	139,856	2,356	112,265	(1)	3,029																	
Per cent of in-	1914	41,372	2,252,268	16,770	807,838	(1)	43,336,322	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—												
crease <sup>2</sup> .....	—63.1	17.4	687.1	4.9	—	—	—11.2	New York.....	1919	4,711	138,650	984	105,149	1,721	91,890	1914	11,439	95,081	1,439	28,445	(1)	97,740	—	—	—	—	—	—	—	—									
California.....	1919	—	—	—	152,810	—	290,315	Ohio.....	1919	905	339,738	85	16,994	325	5,800,995	1914	—	271,397	675	6,480	(1)	7,251,445	—	—	—	—	—	—	—	—									
1914	—	—	—	—	94,886	(1)	—	Oklahoma.....	1919	—	—	10	—	—	—	1914	—	300	—	—	—	—	—	—	—	—	—	—	—	—	—								
Illinois.....	1919	3	418,860	120,000	52,657	30	—200	Pennsylvania.....	1919	6,363	667,259	3,399	126,289	11,330	15,945,505	1914	8,155	521,399	1,501	118,674	(1)	20,939,700	—	—	—	—	—	—	—	—	—	—	—	—	—	—			
1914	—	307,550	—	—	286,976	(1)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—							
Indiana.....	1919	698	523,726	2,486	217,323	49	457,551	Virginia.....	1919	—	—	13,250	—	3,215	—	1914	—	—	16,350	—	1,237	(1)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
1914	—	470,646	2,020	121,744	(1)	453,770	—	Oklahoma.....	1919	—	—	71,296	79	4,187	7	1914	—	28,583	160	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—				
Kansas.....	1919	—	75	—	—	—	699,315	All other states.....	1919	—	63,191	—	8,321	106	984,760	1914	—	75,912	5,655	29,634	(1)	739,572	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Maryland.....	1919	32	35,407	1,440	40,045	102	20,550	West Virginia.....	1919	—	—	—	—	—	—	1914	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—					
1914	2,327	13,528	42	26,163	—	—	58,605	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—					
Missouri.....	1919	206,190	1,229	22,029	(1)	—	800	—	—	—	—	—	—	—	—	1914	14,227	75,912	5,655	29,634	(1)	739,572	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1914	221,666	2,922	40,326	(1)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—				

<sup>1</sup> Included in figures for fuel oils.

<sup>2</sup> A minus sign (−) denotes decrease.

## MANUFACTURES.

## SPECIAL STATISTICS.

Certain additional detailed information concerning the quantity and value of products and the equipment for the industry is collected by means of supplemental schedules, data for which are presented in Tables 11, 12, and 13.

Table 11 shows in detail the quantity and value of the principal products for the glass industry for 1919, 1914, 1909, and 1904.

TABLE 11.—DETAILED STATISTICS OF QUANTITY AND VALUE: 1919, 1914, 1909, AND 1904.

	1919	1914	1909	1904
Products, total value <sup>1</sup> .....	\$261,884,089	\$123,085,019	\$92,095,203	\$79,607,998
Building glass, value.....	\$83,713,115	\$33,824,069	\$26,308,438	\$21,697,861
Window glass—				
Square feet.....	368,912,209	400,998,803	346,089,550	242,615,750
Value.....	\$41,100,724	\$17,495,056	\$11,742,959	\$11,610,851
Obscured glass, including cathedral and skylight—				
Square feet.....	33,822,302	43,040,079	22,815,946	21,870,634
Value.....	\$4,390,308	\$2,417,253	\$1,359,574	\$972,014
Plate glass, total east, square feet.....	72,849,340	75,770,261	60,105,694	34,804,986
Polished—				
Square feet.....	50,823,749	60,383,516	47,370,254	27,293,138
Value.....	\$33,348,279	\$14,773,787	\$12,204,575	\$7,978,253
Rough, made for sale—				
Square feet.....	788,742	131,492	205,690	17,784
Value.....	\$171,118	\$25,859	\$37,431	\$3,529
Wire glass—				
Polished—				
Square feet.....	1,229,077	1,707,848	(2)	(2)
Value.....	\$635,543	\$534,322	(2)	(2)
Rough, made for sale as such—				
Square feet.....	14,462,409	13,980,906	(2)	(2)
Value.....	\$2,271,199	\$1,050,612	(2)	(2)
All other building glass, value.....	\$1,886,044	\$520,280	\$964,599	\$1,133,214
Pressed and blown glass, value.....	\$70,748,861	\$30,279,290	\$27,398,445	\$21,956,158
Tableware, 100 pieces.....	2,457,938	1,554,056	1,298,056	1,283,974
Jellies, tumblers, and goblets, dozens.....				
Lambs, dozens.....	25,182,133	18,030,243	11,687,036	7,346,214
Chimneys, dozens.....	917,250	580,196	322,482	487,017
Lantern globes, dozens.....	6,612,109	6,989,624	6,652,067	7,039,756
Shades, globes, and other gas goods, dozens.....	1,985,741	1,363,562	952,620	1,765,247
Blown tumblers, stem ware, and bar goods, dozens.....	12,313,307	2,016,800	1,541,449	878,244
Opal ware, dozens.....	9,668,638	11,377,310	9,182,060	6,282,606
Cut ware, dozens.....	2,155,972	4,636,051	3,095,666	1,091,208
Decorated glassware, dozens.....	549,170	297,957	206,336	83,736
Lenses, dozens.....	1,052,851	1,158,077	(2)	(2)
Electric bulbs, dozens.....	725,675	(2)	(2)	(2)
Tubing, pounds.....	18,363,603	(2)	(2)	(2)
Bottles and jars, value.....	\$94,670,389	\$51,958,728	\$36,018,333	\$33,631,063
Prescriptions, vials, and drugists' wares, gross.....	6,684,548	4,893,416	3,624,022	3,202,586
Beer, soda, and mineral, gross.....	4,178,368	4,573,610	2,345,204	2,351,852
Liquors and flasks, gross.....	993,030	2,689,022	1,887,344	2,157,801
Milk jars, gross.....	877,268	1,188,891	440,302	253,651
Fruit jars, gross.....	1,860,262	1,198,952	1,124,455	1,061,829
Battery jars and other electrical goods, gross.....	13,805	79,211	9,081	19,974
Patent and proprietary, gross.....	3,364,670	1,384,689	1,637,798	1,557,372
Packers' and preservers', gross.....	4,297,076	3,271,174	1,237,175	1,237,065
Demijohns and carboys, dozens.....	271,119	160,795	122,570	64,450
All other products, value.....	\$12,751,715	\$4,022,932	\$2,369,987	\$2,322,916

<sup>1</sup> In addition, considerable quantities of electrical shades, globes, etc., which can not be shown without disclosing the operations of individual establishments, were made in 1919 and 1914 by establishments engaged primarily in the manufacture of electrical goods. In 1909, 42,639 gross of bottles and jars, valued at \$90,490, and in 1914 glassware, valued at \$9,663, were made as subsidiary products by establishments engaged primarily in other lines of manufacture.

<sup>2</sup> Not reported separately.

Of the 371 establishments reported for 1919, 128 manufactured building glass; 130, pressed and blown

glass; and 145, bottles and jars. Of the 348 establishments reported for 1914, 102 manufactured building glass; 107, pressed and blown glass; and 150, bottles and jars.

In 1919, 32 per cent of the total value of products represented building glass; 27 per cent, pressed and blown glass; 36.1 per cent, bottles and jars; and 4.9 per cent, other products. The corresponding proportions in 1914 were 29.9, 24.6, 42.2, and 3.3 per cent, respectively.

There was an increase of 127.3 per cent in the total value of building glass reported for the period 1914-1919. The most important product in 1919 in this class was window glass, the value reported being 49.1 per cent of the total for building glass. Window glass also occupied first place at the censuses of 1914 and 1909, but plate glass led in 1909.

Pennsylvania produced 151,932,372 square feet of window glass in 1919; West Virginia was second, with 119,804,785 square feet; and Ohio third, with 27,865,050 square feet. Pennsylvania also ranked first in the output of obscured glass, plate glass, and rough wire glass, producing over one-half of the total for each class. Missouri ranked second in the production of these products.

The total value of pressed and blown glass shows an increase of 158.2 per cent for the decade 1909-1919, and of 133.7 per cent for the five-year period 1914-1919. During both the ten-year and five-year periods the increases in the production of jelly glasses, tumblers, and goblets, and in shades, globes, and other gas goods were pronounced. There was a noticeable decline in the production of blown tumblers, stem ware and bar goods in 1919, as compared with the two preceding censuses.

Of the three main classes of products, bottles and jars represented the greatest value at each of the four censuses covered by the table. During the decade 1909-1919 there was an increase of 162.8 per cent in the value of this class of products and for the five-year period 1914-1919 an increase of 82.2 per cent.

Considerable increases were reported in the output of most of the products shown in the table for the period 1914-1919, those showing decreases being largely in the building glass industry, and for liquors and flasks and milk jars in the bottle and jar factories.

Few of the glass factories make finished cut glass, the item "cut ware" representing principally the glass blanks which have not been cut and polished and are sold to establishments making a specialty of producing the finished cut ware. These latter establishments are classified in the census reports under the head of "Glass, cutting, staining, and ornamenting."

"All other products" include a number of unclassified articles, such as glass stoppers, marbles, table tops, etc.

Table 12 shows the value of each of the three classes of glass products, in the leading states, for 1919, 1914, 1909, and 1904.

TABLE 12.—PRODUCTS, BY PRINCIPAL STATES: 1919, 1914, 1909, AND 1904.

	1919	1914	1909	1904
Products, total value.....	\$261,884,080	\$123,085,019	\$82,095,203	\$79,607,998
Illinois.....	18,244,717	7,680,343	5,047,333	5,619,740
Indiana.....	30,106,652	14,881,372	11,593,094	14,706,929
Kansas.....	2,133,470	728,881	2,036,573	958,720
Maryland.....	4,031,841	1,500,982	1,038,368	589,589
Missouri.....	6,927,042	3,882,420	1,992,883	1,781,026
New Jersey.....	13,894,677	7,597,751	6,961,088	6,450,195
New York.....	12,995,741	5,150,714	4,508,790	4,279,766
Ohio.....	35,240,877	19,191,342	14,358,274	9,026,208
Oklahoma.....	4,750,844	2,005,736	(1)	(1)
Pennsylvania.....	80,479,752	39,797,822	32,817,936	27,671,693
Virginia.....	831,455	690,420	681,900	549,031
West Virginia.....	42,730,338	14,631,171	7,779,483	4,598,563
All other states.....	9,716,674	5,340,262	3,279,481	3,376,538
Building glass, value.....	83,713,115	30,824,069	26,308,438	21,697,861
Illinois.....	(1)	(1)	648,718	281,559
Indiana.....	5,485,490	2,356,946	1,616,092	3,790,618
Kansas.....	1,833,470	(1)	1,131,808	381,084
Missouri.....	(1)	3,122,793	1,778,364	1,036,433
New York.....	(1)	(1)	173,387	466,310
Ohio.....	7,204,826	3,805,669	2,744,513	1,625,126
Oklahoma.....	(1)	1,181,057	(1)	(1)
Pennsylvania.....	39,013,933	18,968,873	14,958,049	12,169,013
West Virginia.....	15,217,616	4,410,710	2,751,133	1,323,896
All other states.....	14,357,780	2,977,421	603,774	633,822
Pressed and blown glass, value.....	70,748,861	30,279,290	27,398,445	21,956,158
Indiana.....	6,656,007	2,926,296	2,774,128	2,850,087
Maryland.....	(1)	(1)	503,492	46,191
New Jersey.....	3,108,505	(1)	1,019,836	181,559
New York.....	7,135,823	2,237,980	1,926,852	1,932,524
Ohio.....	16,740,016	6,490,498	6,160,707	3,954,660
Oklahoma.....	890,001	220,520	(1)	(1)
Pennsylvania.....	20,923,793	11,241,495	9,847,228	9,406,183
West Virginia.....	12,943,426	6,263,554	4,306,528	2,620,665
All other states.....	2,351,290	898,987	853,674	955,289
Bottles and jars, value.....	94,670,389	51,958,728	36,018,333	33,631,063
California.....	(1)	(1)	873,434	855,446
Illinois.....	14,410,392	6,680,700	4,304,795	4,949,156
Indiana.....	17,126,052	9,155,163	6,982,378	7,213,456
Maryland.....	3,427,575	1,244,760	529,767	536,478
Missouri.....	(1)	759,627	(1)	607,383
New Jersey.....	10,457,863	7,176,787	5,884,605	6,066,714
New York.....	4,473,507	2,943,683	1,884,394	1,866,245
Ohio.....	8,579,661	7,422,402	4,717,658	2,961,727
Oklahoma.....	2,382,532	603,559	(1)	(1)
Pennsylvania.....	15,120,155	8,930,255	7,778,787	5,951,144
Virginia.....	825,755	690,420	681,900	549,031
West Virginia.....	13,069,308	3,777,445	646,521	602,002
All other states.....	4,785,589	3,173,927	1,735,094	1,472,281
All other products.....	12,751,715	4,022,032	2,369,987	2,322,916

<sup>1</sup> Included in "All other states," to avoid disclosing the operations of individual establishments.

For 1919 Pennsylvania reported 47.3 per cent of the total value of building glass, 29.6 per cent of the total value of pressed and blown glass, and 16 per cent of the total value of bottles and jars, ranking first in the value of building glass and in pressed and blown glass and second in the value of bottles and jars. West Virginia ranked second in value of building glass produced and Ohio third, while in pressed and blown glass Ohio was second and West Virginia third. Indiana ranked first in value of bottles and jars manufactured, followed by Pennsylvania, Illinois, West Virginia, New Jersey, and Ohio.

Of the 128 plants that manufactured building glass in 1919, 79 made window glass, 27 of which were located in West Virginia, 21 in Pennsylvania, 12 in Ohio, 5 in Kansas, 3 each in Indiana and Oklahoma, 2 each in Arkansas, California, and Texas, and 1 each in Illinois and Louisiana; 19 made obscured glass, including cathedral and skylight, 6 of which were in Pennsylvania, 4 in West Virginia, 3 in Indiana, 2 each in Illinois and Ohio, and 1 each in Missouri and New York; 17 made plate glass, 9 of which were in Pennsylvania, 2 each in Ohio and West Virginia, and 1 each in Illinois, Indiana, Michigan, and Missouri; 7 made wire glass, 4 of which were in Pennsylvania, and 1 each in Illinois, Missouri, and West Virginia. Pennsylvania, with 34 establishments, Ohio with 20, and West Virginia with 31, in the order named, were the leading states in value of pressed and blown glass produced in 1919. Named in the order of their importance, the leading states producing tableware were Indiana, Ohio, West Virginia, and Pennsylvania; jelly glasses, tumblers, and goblets—West Virginia, Ohio, Pennsylvania, and Indiana; lamps—New York, Ohio, and Pennsylvania; lamp chimneys—Indiana, Ohio, West Virginia, and Pennsylvania; blown tumblers, stem ware, and bar goods—West Virginia, Ohio, and Pennsylvania; cut ware and decorated ware—West Virginia, Ohio, and Pennsylvania; electric bulbs—Ohio, New York, and Pennsylvania; tubing—New Jersey, Ohio, New York, and Pennsylvania.

Of the 145 establishments that produced bottles and jars in 1919, 35 were in Pennsylvania, 18 in Indiana, 15 each in New Jersey and West Virginia, 11 in Ohio, 10 each in New York and Oklahoma, 9 in Illinois, 6 in Maryland, 5 in California, 4 in Virginia, 2 in Missouri, and 1 each in Louisiana, South Carolina, Tennessee, Washington, and Wisconsin.

Named in the order of their importance, the leading states producing prescription bottles, vials, and drug-gists' wares were: Illinois, Indiana, Maryland, New Jersey, Pennsylvania, and West Virginia; beer, soda, and mineral water bottles—Ohio, Illinois, Indiana, Pennsylvania, and New York; liquors and flasks—West Virginia, Ohio, Indiana, and Pennsylvania; fruit jars—Indiana, Oklahoma, Ohio, and Pennsylvania; packers and preservers—West Virginia, Pennsylvania, and Indiana; patent and proprietary bottles—New Jersey, West Virginia, and Pennsylvania.

The measure of production for a glass factory is the melting capacity of its furnaces and tanks.

Table 13 presents the statistics of such equipment for the census years 1919, 1914, 1909, and 1904. The idle furnaces and tanks shown in this table represent the idle equipment of active establishments and not the equipment of establishments which were idle throughout the year.

## MANUFACTURES.

Of the 289 pot furnaces, with a capacity of 4,247 pots, operated in 1919, 19 furnaces, with 360 pots, were used in making window glass; 13 furnaces, with 171 pots, in producing obscured glass; and 80 furnaces, with 1,544 pots, in making plate glass. There were 79 continuous tanks, with a capacity of 1,463 rings,

operated in producing building glass. Of this number, 58 tanks, with 1,169 rings, were used in producing window glass; 10 tanks, with 140 rings, in making obscured glass; 8 tanks, with 56 rings, in producing wire glass; and 3 tanks, with 98 rings, in making plate glass.

TABLE 13.—EQUIPMENT: 1919, 1914, 1909, AND 1904.

<sup>1</sup> In addition, 71 establishments reported for 1919, 161 tanks equipped with 640 automatic machines; in 1914, 26 establishments reported 106 tanks equipped with 831 automatic machines.

## GENERAL TABLES.

Table 14 shows, for 1919, 1914, and 1909, by states, the number of establishments, average number of wage earners, primary horsepower, wages, cost of

materials, and value of products for the glass industry. Table 15 presents, for 1919, by states, more detailed statistics of the industry.

TABLE 14.—COMPARATIVE SUMMARY, BY STATES: 1919, 1914, AND 1909.

TABLE 15.—DETAILED STATEMENT, BY STATES: 1919.

STATE.	Number of establish- ments	PERSONS ENGAGED IN THE INDUSTRY.							WAGE EARNERS DEC. 15, OR NEAREST REPRESENTATIVE DAY.						EXPENSES.		
		Total.	Propri- tors and firm mem- bers.	Salaried offi- cers, super- in- tendents, and man- agers.	Clerks, etc.		Wage earners.		Total.	16 and over.		Under 16.		Capital.	Salaries and wages.		
					Male.	Female.	Ave- rage num- ber.	Number, 15th day of—		Male.	Female.	Male.	Female.		Officials.	Clerks, etc.	
United States.	371	\$3,650	60	2,438	2,042	1,596	77,520	No 85,416	Ju 65,055	93,320	81,214	10,410	1,415	281	\$215,050,436	\$8,547,791	\$4,816,778
California.	7	1,431	3	25	53	17	1,333	No 1,781	Au 581	1,410	1,358	52	.....	.....	2,082,731	120,577	96,361
Illinois.	14	4,370	4	160	76	65	4,065	Fe 4,291	De 3,825	4,187	3,070	481	31	5	13,005,050	416,860	131,426
Indiana.	35	9,911	.....	236	186	139	9,350	No 10,492	Au 7,860	10,494	8,599	1,398	423	74	19,900,866	952,675	391,750
Kansas.	5	626	.....	22	10	10	584	Oe 821	Je 194	875	874	1	.....	.....	976,904	65,977	25,625
Maryland.	8	1,879	6	41	56	21	1,755	No 1,943	Au 1,252	1,901	1,577	270	37	17	2,360,036	170,716	131,908
Missouri.	4	2,136	.....	50	24	28	2,034	Mh 2,299	Au 1,663	2,574	2,306	268	.....	.....	7,884,372	222,105	53,785
New Jersey.	21	6,493	5	136	264	146	5,942	De 0,811	Au 4,458	6,966	5,997	882	75	12	12,508,430	558,524	630,941
New York.	19	4,490	6	142	171	152	3,929	De 4,432	Jy 2,695	4,554	4,089	332	111	2	11,160,015	435,064	395,293
Ohio.	44	11,761	.....	297	305	224	10,935	De 12,085	Jy 0,077	13,346	11,376	916	44	10	27,690,039	1,092,229	763,239
Oklahoma.	16	1,811	6	70	19	15	1,692	Ap 2,297	Jy 987	2,103	1,855	232	12	4	4,248,214	223,012	60,300
Pennsylvania.	102	23,490	18	718	572	580	21,602	No 24,944	Ju 18,809	26,764	23,502	6,775	457	130	71,852,560	2,438,507	1,323,630
Virginia.	4	668	.....	18	7	2	641	Ju 700	Ja.. 524	655	593	118	4	.....	947,837	41,505	11,940
West Virginia.	77	12,555	12	420	274	172	11,668	Oc 12,854	Ju 9,554	14,772	12,982	1,573	195	22	36,457,591	1,517,517	729,231
All other states <sup>a</sup> .	15	2,125	.....	85	25	25	1,990	.....	.....	2,089	2,466	192	26	5	4,596,791	291,223	66,379
EXPENSES—continued.																	
STATE.	Salaries and wages—Con.	EXPENSES.				POWER.						Primary horsepower.			Electric horse-power generated in establish- ments reporting.		
		For contract work.		Rent and taxes.		For materials.		Value of products.	Value added by manufac- ture.	Owned.							
		Wage earners.	Rent of factory.	Taxes, Federal, state, county, and local.	Principal materials.	Fuel and rent of power.	Total.			Steam engines (not turbines).	Steam turbines.	Internal-combustion engines.	Water power. <sup>1</sup>	Rent ed. <sup>2</sup>			
United States.	\$87,526,625	\$240,750	\$148,826	\$9,854,179	\$66,422,262	\$24,357,862	\$261,884,080	\$171,103,956	207,430	80,715	18,425	52,877	2,457	52,958	90,261		
California.	1,654,360	.....	8,944	59,836	903,703	421,775	3,700,787	2,435,309	2,764	45	.....	.....	.....	2,719	2,637	2,822	
Illinois.	3,740,590	.....	3,851	1,485,406	3,451,127	2,108,152	18,244,717	12,685,438	10,594	4,457	2,500	1,000	.....	2,710	2,039	8,386	
Indiana.	9,012,581	104,008	6,501	925,142	10,513,348	2,641,258	30,106,652	16,952,046	18,977	5,050	1,500	6,039	216	2	5,758	1,573	20
Kansas.	1,195,872	.....	31,816	401,597	145,098	2,133,470	1,526,775	313	.....	.....	.....	23	70	.....	1,710	2,039	
Maryland.	1,643,239	.....	660	172,219	656,500	382,249	4,031,841	2,993,092	1,848	275	.....	.....	.....	1,573	2,888	11,420	
Missouri.	2,411,517	.....	163	463,420	1,050,295	910,113	6,927,042	4,366,634	14,188	7,925	1,350	4,508	.....	405	2,788	112	
New Jersey.	6,006,747	1,345	725	587,975	3,141,992	1,308,226	13,694,677	9,240,159	4,684	1,744	.....	1,230	.....	1,710	2,039	23,797	
New York.	5,003,901	2,100	9,450	596,430	2,824,041	1,220,920	12,695,741	8,950,780	4,893	1,150	750	1,325	.....	2,858	3,858	8,586	
Ohio.	12,111,911	31,279	95,908	1,147,955	8,084,050	3,668,347	35,240,877	22,588,480	37,831	19,165	6,750	5,325	5	8,586	23,797	977	
Oklahoma.	1,753,686	.....	88	63,291	1,007,933	304,362	4,750,844	2,838,549	2,795	350	.....	1,930	.....	495	495	27,441	
Pennsylvania.	26,471,740	67,335	11,454	2,562,170	19,896,838	7,761,299	80,479,752	52,821,615	70,250	30,279	5,550	17,087	.....	17,364	391	11,940	
Virginia.	393,636	.....	9,973	236,706	94,723	.....	831,455	499,936	611	220	.....	17,397	2,450	8,772	12,372	875	
West Virginia.	13,656,559	34,683	10,905	1,569,140	11,010,447	2,790,087	42,730,338	28,928,904	29,494	2,875	.....	1,608	.....	1,608	1,608	1,608	
All other states <sup>a</sup> .	2,409,977	120	170,406	1,083,595	605,353	5,955,887	4,266,939	8,158	6,550	.....	.....	.....	.....	.....	.....	.....	

<sup>1</sup> Includes water wheels and turbines (irrespective of ownership of water supply), and water motors (operated by water from city mains).<sup>2</sup> Chiefly electric motors operated by rented (or purchased) current; other power included (chiefly shaft-belt or transmitted power from neighboring power plants).<sup>3</sup> All other states embrace: Arkansas, 3 establishments; Louisiana, 2; Massachusetts, 1; Michigan, 1; Rhode Island, 1; South Carolina, 1; Tennessee, 1; Texas, 2; Washington, 1; Wisconsin, 2.

DEPARTMENT OF COMMERCE  
BUREAU OF THE CENSUS  
WASHINGTON

FOURTEENTH CENSUS OF THE UNITED STATES  
MANUFACTURES: 1919

# GLUCOSE AND STARCH

Prepared under the supervision of EUGENE F. HARTLEY, Chief Statistician for Manufactures

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## EXPLANATION OF TERMS.

**Scope of census.**—Census statistics of manufactures are compiled primarily for the purpose of showing the absolute and relative magnitude of the different branches of industry covered and their growth or decline. Incidentally, the effort is made to present data throwing light upon character of ownership, size of establishments, and similar subjects. When use is made of the statistics for these purposes it is imperative that due attention be given to their limitations, particularly in connection with any attempt to derive from them figures purporting to show average wages, cost of production, or profits.

The census did not cover establishments which were idle during the entire year or for which products were valued at less than \$500, or the manufacturing done in educational, eleemosynary, and penal institutions.

**Period covered.**—The returns relate to the calendar year 1919, or the business year which corresponded most nearly to that calendar year, and cover a year's operations, except for establishments which began or discontinued business during the year.

**The establishment.**—As a rule, the term "establishment" represents a single plant or factory, but in some cases it represents two or more plants which were operated under a common ownership or for which one set of books of account was kept. If, however, the plants constituting an establishment as thus defined were not all located within the same city, county, or state, separate reports were secured in order that the figures for each plant might be included in the statistics for the city, county, or state in which it was located. In some instances separate reports were secured for different industries carried on in the same establishment.

**Classification by industries.**—The establishments were assigned to the several classes of industries according to their products of chief value. The products reported for a given industry may thus, on the one hand, include minor products different from those covered by the class designation, and, on the other hand, may not represent the total product covered by this designation, because some products of this class may be made in establishments in which it is not the product of chief value.

**Influence of increased prices.**—In comparing figures for cost of materials, value of products, and value added by manufacture in 1919 with the corresponding figures for earlier censuses, account should be taken of the general increase in the prices of commodities during recent years. To the extent to which this factor has been influential the figures fail to afford an exact measure of the increase in the volume of business.

**Persons engaged in the industry.**—The following general classes of persons engaged in the manufacturing industries were distinguished: (1) Proprietors and firm members, (2) salaried officers of corporations, (3) superintendents and managers, (4) clerks (including other subordinate salaried employees), and (5) wage earners.

The number of persons engaged in each industry, segregated by sex, and, in the case of wage earners, also by age (whether under 16 or 16 and over), was reported for a single representative day. The 15th of December was selected as representing for most industries normal conditions of employment, but where this date did not portray such conditions, an earlier date was requested.

In the case of employees other than wage earners the number thus reported for the representative date has been treated as equivalent to the average for the year, since the number of employees of this class does not ordinarily vary much from month to month. In the case of wage earners the average has been obtained in the manner explained in the next paragraph.

In addition to the more detailed report by sex and age of the number of wage earners on the representative date, a report was obtained of the number employed on the 15th of each month, by sex, without distinction of age. From these figures the average number of wage earners for the year has been calculated by dividing the sum of the numbers reported for the several months by 12. The importance of the industry as an employer of labor is believed to be more accurately measured by this average than by the number employed at any one time or on a given day.

The number of wage earners reported for the representative day, though given in certain tables for each separate industry, is not totaled for all industries combined, because, in view of the variations of date, such a total is not believed to be significant. It would involve more or less duplication of persons working in different industries at different times, would not represent the total number employed in all industries at any one time, and would give an undue weight to seasonal industries as compared with industries in continual operation.

In order to determine as nearly as possible the age distribution of the average number of wage earners for an industry, the per cent distribution by age of the wage earners for December 15, or the nearest representative day, has been calculated from the actual numbers reported for that date. The percentages thus obtained have been applied to the average number of wage earners for the year to determine the average numbers 16 years and over, and under 16, employed.

**Salaries and wages.**—Under these heads are given the total payments during the year for salaries and wages, respectively. The Census Bureau has not undertaken to calculate the average annual earnings of either salaried employees or wage earners. Such averages would possess little real value, because they would be based on the earnings of employees of both sexes, of all ages, and of widely varying degrees of skill. Furthermore, so far as wage earners are concerned, it would be impossible to calcu-

late accurately even so simple an average as this, since the number of wage earners fluctuates from month to month in every industry, and in some cases to a very great extent. The Census Bureau's figures for wage earners, as already explained, are averages based on the number employed on the 15th of each month, and while representing the number according to the pay rolls to whom wages were paid on that date, no doubt represent a larger number than would be required to perform the work in any industry if all were continuously employed during the year.

**Prevailing hours of labor.**—No attempt was made to ascertain the number of wage earners working a given number of hours per week. The inquiry called merely for the prevailing practice followed in each establishment. Occasional variations in hours in an establishment from one part of the year to another were disregarded, and no attention was paid to the fact that a few wage earners might have hours differing from those of the majority. All the wage earners of each establishment are therefore counted in the class within which the establishment itself falls. In most establishments, however, practically all the wage earners work the same number of hours, so that the figures give a substantially correct representation of the hours of labor.

**Capital (amount actually invested).**—The instructions on the schedule for securing data relating to capital were as follows:

"The answer should show the total amount of capital, both owned and borrowed, on the last day of the business year reported. All the items of fixed and live capital may be taken at the amounts carried on the books. If land or buildings are rented, that fact should be stated and no value given. If a part of the land or building is owned, the remainder being rented, that fact should be so stated and only the value of the owned property given. Do not include securities and loans representing investments in other enterprises."

These instructions were identical with those employed at the census of 1914 and 1909. The data compiled in respect to capital, however, at both censuses, as well as at all preceding censuses of manufactures, have been so defective as to be of little value except as indicating general conditions. In fact, it has been repeatedly recommended by the census authorities that this inquiry be omitted from the schedule. While there are some establishments whose accounting systems are such that an accurate return for capital could be made, this is not true of the great majority, and the figures therefore do not show the actual amount of capital invested.

**Materials.**—The statistics as to cost of materials relate to the materials used during the year, which may be more or less than the materials purchased during the year. The term "materials" covers fuel, rent of power and heat, mill supplies, and containers, as well as materials which form a constituent part of the product.

**Rent and taxes.**—The taxes include certain Federal taxes and state, county, and local taxes. Under "Federal taxes" there are included the internal revenue tax on manufactures (tobacco, beverages, etc.), excise taxes when included in values reported for products, corporation capital stock tax, and corporation income tax, but not the income tax for individuals and partners.

**Value of products.**—The amounts given under this heading represent the selling value or price at the factory of all products manufactured during the year, which may differ from the value of the products sold.

**Value added by manufacture.**—The value of products is not always a satisfactory measure of either the absolute or the relative importance of a given industry, because only a part of this value is actually created by the manufacturing processes carried on in the industry itself. Another part, and often by far the larger one, represents the value of the materials used. For many purposes, therefore, the best measure of the importance of an industry, from a manufacturing standpoint, is the value created by the manufacturing operations carried on within the industry. This value is calculated by deducting the cost of the materials used from the value of the products. The figure thus obtained is termed in the census reports "value added by manufacture."

**Cost of manufacture and profits.**—The census data do not show the entire cost of manufacture, and consequently can not be used for the calculation of profits. No account has been taken of depreciation or interest, rent of offices and buildings other than factory or works, insurance, ordinary repairs, advertising, and other sundry expenses.

**Primary horsepower.**—This item represents the total primary power equipment of the manufacturing establishments plus the amount of power, principally electric, rented from other concerns. It does not cover the power of electric motors taking their current from dynamos driven by primary power machines operated by the same establishment, because the inclusion of such power would obviously result in duplication. The figures for primary horsepower represent the rated capacity of the engines, motors, etc., and not the amount of power in actual daily use.

**Fuel.**—Statistics of the quantity of fuel used are shown only for anthracite and bituminous coal, coke, fuel oils, gasoline and other volatile oils, and gas, and represent the quantity used during the year. As only the principal kinds of fuel are shown, comparison as to the total cost of all fuel is impracticable.

## GLUCOSE AND STARCH.

### GENERAL STATISTICS.

**General character of the industry.**—This report presents statistics for establishments engaged primarily in the manufacture of glucose and starch. Since some of the establishments reported the manufacture of both products, separate statistics for each have no special significance. In all tables, except Table 1, only combined figures are presented.

**Importance and growth of the industry.**—Table 1 summarizes the statistics for the glucose and starch industry as a whole since 1904, with percentages of increase, and presents a summary of the statistics for each of the two classes of establishments—(1) those engaged primarily in the manufacture of glucose and (2) those engaged primarily in the manufacture of starch—as reported at the censuses of 1919, 1914, 1909, and 1904, with percentages of increase.

The large increases from 1914 to 1919, in salaries and wages, cost of materials, and value of products are due largely to the general increase in cost of production following the World War and do not, therefore, fairly measure the growth of the industry for that period. A truer index of the conditions is found in the increases in the average number of wage earners and primary horsepower. The addition of the Federal income tax since 1914 will account for the increase in "Rent and taxes."

**States, ranked by value of products.**—Measured by value of products, the states engaged primarily in the manufacture of glucose and starch rank as follows: (1) Illinois, (2) New Jersey, (3) Iowa, (4) Indiana, (5) New York, (6) Michigan, (7) Maine, (8) Ohio, (9) Missouri, (10) Connecticut, (11) Kentucky, (12) Minnesota, (13) Florida, (14) Massachusetts, (15) Nebraska, (16) Oregon.

Detailed statistics for states that could be shown without disclosing individual operations will be found in Table 13.

**Persons engaged in the industry.**—The age classification of the average number of wage earners in Table 2 is an estimate obtained by the method described in the "Explanation of terms." The classification, by sex, for 1919 was reported separately, but for 1914 and 1909 was obtained in the same manner as the distribution by age. Figures in detail will be found in Table 13.

**Wage earners, by months.**—The statistics for wage earners in Table 3 show the regularity of employment, or the reverse, together with the percentage which the number reported for each of the several months forms of the number reported for the maximum month.

**Average number of wage earners, by prevailing hours of labor: 1919, 1914, and 1909.**—Table 4 shows a general tendency in this industry toward a reduction in the number of hours of labor per week. In 1914, 98.4 per cent of the total number of wage earners were employed in establishments where the prevailing hours were 60 or more, as against 38.4 per cent in 1919.

**Size of establishments, by average number of wage earners.**—Table 5 discloses the significant fact that 42 establishments, or 75 per cent of the total number for the industry, employed fewer than 100 wage earners; while 14 establishments, or 25 per cent, employed 96.5 per cent of the total average number.

**Size of establishments, by value of products.**—At the censuses of 1909 and 1914 establishments with products valued at "\$100,000 to \$1,000,000" constituted one group, but at the census of 1919 this group was subdivided into "\$100,000 to \$500,000" and "\$500,000 to \$1,000,000." Separate figures for the number of establishments and value of products have been compiled, however, from the returns for 1914. The table, therefore, gives combined figures for these two groups for all items for 1909 and for the average number of wage earners and value added by manufacture for 1914. The statistics in Table 6 show the degree of concentration of production in large establishments.

**Character of ownership.**—Table 7 emphasizes the predominance of the corporate form of ownership. Corporations owned 53.6 per cent of the total number of establishments for the industry in 1919, employed 98.4 per cent of the total average number of wage earners, and reported 99.4 per cent of the value of products.

**Number and horsepower of types of prime movers.**—Table 8 shows, from 1914 to 1919, an increase of 26.9 per cent in total horsepower for the industry due largely to the increase in rented power.

**Fuel consumed.**—Table 9 shows the principal kinds of fuel used in the industry for 1919 and 1914. In 1914 gasoline and other volatile oils were included in fuel oils.

## MANUFACTURES.

TABLE 1.—COMPARATIVE SUMMARY: 1919, 1914, 1909, AND 1904.

	1919	1914	1909	1904	PER CENT OF INCREASE, <sup>1</sup>		
					1914-1919	1909-1914	1904-1909
TOTAL FOR THE INDUSTRY.							
Number of establishments.....	56	89	118	140	-24.6	-15.7	
Persons engaged.....	8,694	5,957	5,827	5,409	2.2	7.7	
Proprietors and firm members.....	37	70	80	111	-22.5		
Salaried employees.....	862	1,378	968	619	-5.5	50.4	2.9
Wage earners (average number).....	7,795	4,509	4,773	4,679	72.9	42.4	
Primary horsepower.....	52,846	41,639	28,257	35,986	26.9	47.4	-21.5
Capital.....	\$55,182,682	\$43,642,343	\$38,586,419	\$24,053,008	33.3	12.3	61.6
Salaries and wages.....	14,174,845	5,489,697	4,079,722	3,295,711	158.2	34.6	23.8
Salaries.....	2,212,362	1,910,132	1,112,239	654,652	14.0	37.3	115.9
Wages.....	11,962,483	3,549,565	2,666,483	2,641,059	237.0	33.1	1.0
Paid for contract work.....	551	16,394	3,820	(2)	-96.6	329.2	
Rent and taxes.....	4,034,324	217,529	369,628	113,089	1,754.6	-41.1	226.8
Cost of materials.....	130,328,848	40,207,592	36,598,771	3 25,518,876	224.1	9.0	44.6
Value of products.....	186,256,260	52,615,401	48,799,311	32,649,836	254.0	7.8	49.5
Value added by manufacture <sup>4</sup> .....	55,027,412	12,407,609	11,900,540	7,130,960	350.7	4.3	66.9
GLUCOSE.							
Number of establishments.....	9	7	8	9	-	-	
Persons engaged.....	5,569	3,647	3,454	3,247	52.7	5.6	6.4
Proprietors and firm members.....	1	—	6	—	—	—	
Salaried employees.....	559	918	600	371	-39.1	53.0	61.7
Wage earners (average number).....	5,009	2,729	2,848	2,876	83.5	-4.2	-1.0
Primary horsepower.....	34,640	23,500	16,923	(2)	40.9	45.3	
Capital.....	\$35,104,327	\$26,572,403	\$21,446,328	\$17,045,313	32.1	23.9	25.8
Salaries and wages.....	9,288,690	3,638,197	2,594,912	2,162,837	155.3	40.2	30.0
Salaries.....	1,357,733	1,311,217	957,588	388,257	3.5	36.9	146.6
Wages.....	7,930,957	2,326,980	1,637,324	1,774,580	240.8	42.1	-7.7
Paid for contract work.....	—	14,522	(2)	—	—	—	
Rent and taxes.....	2,808,931	119,997	232,355	3 77,138	2,290.8	-48.4	201.3
Cost of materials.....	95,610,637	29,903,655	25,271,792	20,258,022	219.7	18.4	24.7
Value of products.....	134,548,169	38,619,383	32,930,918	24,566,632	248.4	17.3	34.6
Value added by manufacture <sup>4</sup> .....	38,937,472	8,700,728	7,659,120	4,308,910	347.1	13.7	77.8
STARCH.							
Number of establishments.....	47	82	110	131	-25.4	-16.0	
Persons engaged.....	3,125	2,310	2,373	2,162	35.3	-2.2	9.8
Proprietors and firm members.....	36	70	80	111	-	-	-27.9
Salaried employees.....	303	460	368	248	-34.1	25.0	48.4
Wage earners (average number).....	2,786	1,780	1,925	1,803	56.5	-7.5	6.8
Primary horsepower.....	18,206	17,049	11,334	(2)	6.8	50.4	
Capital.....	\$23,078,355	\$17,069,940	\$17,420,091	\$7,007,695	35.2	-2.0	148.6
Salaries and wages.....	4,886,155	1,851,500	1,484,810	1,132,874	163.9	-24.7	31.1
Salaries.....	854,629	628,915	455,651	260,395	35.9	38.0	71.0
Wages.....	4,031,526	1,222,553	1,029,159	866,479	229.8	18.8	18.8
Paid for contract work.....	551	1,872	3,820	(2)	-70.6	—	
Rent and taxes.....	1,165,393	97,532	137,243	3 35,951	1,094.9	-28.9	281.8
Cost of materials.....	34,718,211	10,297,937	11,626,979	5,280,854	237.1	-11.4	121.0
Value of products.....	51,708,151	13,996,018	15,808,393	8,082,904	260.4	-11.8	96.3
Value added by manufacture <sup>4</sup> .....	16,989,940	3,698,051	4,241,414	2,822,050	359.4	-12.8	50.3

<sup>1</sup> A minus sign (—) denotes decrease; percentages are omitted where base is less than 100.<sup>2</sup> Figures not available.<sup>3</sup> Exclusive of internal revenue.<sup>4</sup> Value of products less cost of materials.

TABLE 2.—PERSONS ENGAGED IN THE INDUSTRY: 1919, 1914, AND 1909.

CLASS.	Cen-sus year.	Total.	Male.	Fe-male.	PER CENT OF TOTAL.		CLASS.	Cen-sus year.	Total.	Male.	Fe-male.	PER CENT OF TOTAL.	
					Male.	Fe-male.							
All classes.....	1919	8,694	7,779	915	89.5	10.5	Clerks and other subordinate salaried employees.....	1910	465	328	137	70.5	29.5
	1914	5,957	5,386	571	90.4	9.6		1914	1,208	1,006	202	83.3	16.7
	1909	5,827	5,319	508	91.3	8.7		1909	827	700	127	84.6	15.4
Proprietors and officials.....	1919	434	432	2	99.5	0.5	Wage earners (average number).....	1919	7,795	7,019	776	90.0	10.0
	1914	240	236	4	98.3	1.7		1914	4,509	4,144	365	91.9	8.1
	1909	227	225	2	99.1	0.9		1909	4,773	4,394	379	92.1	7.9
Proprietors and firm members.....	1919	37	37	—	100.0	—	16 years of age and over.....	1919	7,788	7,013	775	90.0	10.0
	1914	70	68	2	97.1	2.9		1914	4,506	4,142	364	91.9	8.1
	1909	86	84	2	97.7	2.3		1909	4,764	4,389	375	92.1	7.9
Salaried officers of corporations.....	1919	61	60	1	98.4	1.6	Under 16 years of age.....	1919	7	6	1	85.7	14.3
	1914	54	53	1	98.1	1.9		1914	3	2	1	66.7	33.3
	1909	49	49	—	100.0	—		1909	9	5	4	55.6	44.4
Superintendents and managers.....	1919	336	335	1	99.7	0.3							
	1914	116	115	1	99.1	0.9							
	1909	92	92	—	100.0	—							

# GLUCOSE AND STARCH INDUSTRY.

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TABLE 3.—WAGE EARNERS, BY MONTHS, FOR STATES: 1919.

[The month of maximum employment for each state is indicated by bold-faced figures and that of minimum employment by *italic* figures.]

STATE.	Average number employed during year.	NUMBER EMPLOYED ON 15TH DAY OF THE MONTH OF NEAREST REPRESENTATIVE DAY.												Per cent minimum is of maximum.
		Janu-	Febru-	March.	April.	May.	June.	July.	August.	Septem-	ber.	Octo-	Novem-	ber.
		ary.	ary.							ber.	ber.	ber.	ber.	ber.
United States:														
1919.....	7,795	8,916	8,103	6,787	6,738	7,055	7,603	5,989	7,345	9,116	9,089	8,690	8,109	65.7
Males.....	7,019	7,611	7,165	6,226	6,243	6,382	6,768	5,472	6,702	8,137	8,243	7,877	7,403	75.5
Females.....	776	1,305	938	562	495	673	835	517	643	979	846	813	706	37.9
1914.....	4,509	4,850	4,922	4,948	4,608	4,182	4,405	4,157	4,403	4,627	4,377	4,139	4,480	83.6
1909.....	4,773	4,731	4,827	4,954	4,624	4,578	4,586	4,245	4,193	4,812	5,569	5,398	4,771	75.4
Iowa.....	1,007	1,431	1,264	1,061	1,253	1,272	823	834	849	856	869	809	762	53.3
Maine.....	255	507	508	517	647	103	117	131	67	104	218	157	88	12.2
Maine.....	16	9	8	22	37	26	13	9	6	8	28	17	9	16.2
All other states.....	6,517	6,963	6,323	5,187	4,901	5,654	6,650	5,015	6,423	8,148	7,974	7,707	7,249	60.1

TABLE 4.—AVERAGE NUMBER OF WAGE EARNERS, BY PREVAILING HOURS OF LABOR PER WEEK, FOR STATES: 1919, 1914, AND 1909.

HOURS PER WEEK.	AVERAGE NUMBER.			PER CENT OF TOTAL.			HOURS PER WEEK.	AVERAGE NUMBER.			PER CENT OF TOTAL.		
	1919	1914	1909	1919	1914	1909		1919	1914	1909	1919	1914	1909
	7,795	4,509	4,773	100.0	100.0	100.0		17	4	0.2	0.1	0.2	0.3
Total.....	7,795	4,509	4,773	100.0	100.0	100.0	Between 48 and 54.....	27	9	16	0.3	0.2	0.3
44 and under.....	11	(2)	(2)	0.1	-----	-----	54.....	479	16	-----	6.1	0.4	-----
Between 44 and 48.....	4,272	(2)	(2)	54.8	1.0	1.5	Between 54 and 60.....	1,479	2,903	1,251	19.0	64.4	29.2
48 <sup>1</sup> .....	47	70	70	Over 60.....	1,510	1,534	3,432	19.4	34.0	71.9	-----	-----	-----

<sup>1</sup> Includes 48 and under for 1914 and 1909.

<sup>2</sup> Figures not available.

TABLE 5.—SIZE OF ESTABLISHMENTS, BY AVERAGE NUMBER OF WAGE EARNERS, FOR STATES: 1919.

STATE.	TOTAL.		ESTABLISHMENTS EMPLOYING—																	
	Establishments.	Wage earners (average number).	No. wage earners.	1 to 5 wage earners, inclusive.		6 to 20 wage earners, inclusive.		21 to 50 wage earners, inclusive.		51 to 100 wage earners, inclusive.		101 to 250 wage earners, inclusive.		251 to 500 wage earners, inclusive.		501 to 1,000 wage earners, inclusive.		Over 1,000 wage earners.		
			Establishments.	Establishments.	Establishments.	Establishments.	Establishments.	Establishments.	Establishments.	Establishments.	Establishments.	Establishments.	Establishments.	Establishments.	Establishments.	Establishments.	Establishments.	Establishments.		
United States.....	1919.....	56	7,795	3	31	69	4	37	3	105	1	60	5	1,028	5	2,031	3	2,267	1	2,198
1914.....	89	4,509	2	65	147	7	76	1	50	1	65	7	1,300	4	1,390	2	1,475	-----	-----	
Iowa.....	4	1,007	1	23	61	1	9	-----	-----	-----	-----	1	231	2	776	-----	-----	-----	-----	
Maine.....	26	255	1	23	61	1	9	-----	-----	-----	-----	1	195	-----	-----	-----	-----	-----	-----	
Minnesota.....	6	16	5	5	8	1	8	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	

TABLE 6.—SIZE OF ESTABLISHMENTS, BY VALUE OF PRODUCTS: 1919, 1914, AND 1909.

VALUE OF PRODUCT.	NUMBER OF ESTABLISHMENTS.			AVERAGE NUMBER OF WAGE EARNERS.			VALUE OF PRODUCTS.			VALUE ADDED BY MANUFACTURE.		
	1919	1914	1909	1919	1914	1909	1919	1914	1909	1919	1914	1909
	Establishments.	Establishments.	Establishments.	Establishments.	Establishments.	Establishments.	Establishments.	Establishments.	Establishments.	Establishments.	Establishments.	Establishments.
All classes.....	56	89	118	7,795	4,509	4,773	\$18,256,260	\$52,615,401	\$48,799,311	\$55,927,412	\$12,407,809	\$11,900,540
Less than \$5,000.....	4	5	21	1	4	25	12,154	16,950	60,946	2,407	5,514	19,025
\$5,000 to \$20,000.....	18	50	60	24	126	126	200,282	624,358	665,195	45,768	105,671	207,150
\$20,000 to \$100,000.....	16	11	15	124	116	85	758,847	393,231	555,487	178,620	137,086	157,907
\$100,000 to \$1,000,000.....	4	5	9	122	206	504	1,894,602	2,282,498	4,074,394	464,228	657,943	1,450,316
\$1,000,000 and over.....	14	12	13	7,524	3,907	4,033	183,390,375	49,298,364	43,443,329	55,236,359	11,441,595	10,066,142
PER CENT DISTRIBUTION.												
All classes.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Less than \$5,000.....	7.1	5.6	17.8	(1)	0.1	0.5	(1)	(1)	0.1	(1)	0.1	0.2
\$5,000 to \$20,000.....	32.1	62.0	50.8	0.3	2.8	2.6	0.1	1.2	1.4	0.1	1.3	1.7
\$20,000 to \$100,000.....	28.6	12.4	12.7	1.6	2.6	1.8	0.4	0.7	1.1	0.3	1.1	1.3
\$100,000 to \$1,000,000.....	7.1	5.6	7.6	1.6	5.9	10.6	1.0	4.3	8.3	0.8	5.3	12.2
\$1,000,000 and over.....	25.0	13.5	11.0	96.5	88.6	84.5	98.5	93.7	90.0	98.8	92.2	84.6

<sup>1</sup> Less than one-tenth of 1 per cent.

## MANUFACTURES.

TABLE 7.—CHARACTER OF OWNERSHIP, BY STATES: 1919 AND 1914.

STATE.	Cen-	SUS-	YEAR.	NUMBER OF ESTABLISH- MENTS OWNED BY—	AVERAGE NUMBER OF WAGE EARNERS.						VALUE OF PRODUCTS.							
					In establishments owned by—			Per cent of total.			Total.			Of establishments owned by—				
					Total.	Indi- vid- uals.	Cor- porations.	All oth- ers.	Indi- vid- uals.	Cor- porations.	All oth- ers.	Individ- uals.	Corpor- ations.	All oth- ers.	Individ- uals.	Cor- porations.	All oth- ers.	
United States.....	1919	17	30	9	7,795	102	7,674	19	1.3	98.4	0.2	\$136,256,250	\$885,877	\$185,149,779	\$220,604	0.5	99.4	0.1
	1914	43	34	12	4,509	99	4,373	37	2.2	97.0	0.8	52,615,401	488,822	51,882,282	244,297	0.9	98.6	0.5
	1909	47	55	16	4,773	1310	4,483	.....	6.5	93.5	.....	48,799,311	11,841,873	49,957,437	13.8	96.2	.....	.....
Iowa.....	1919	.....	4	.....	1,007	.....	1,007	.....	100.0	.....	.....	24,688,750	.....	24,688,750	.....	100.0	.....	.....
	1914	.....	3	.....	909	.....	909	.....	100.0	.....	.....	9,071,324	.....	9,071,324	.....	100.0	.....	.....
Maine.....	1919	14	4	8	255	35	201	19	13.7	73.8	7.5	1,752,058	356,014	1,175,450	220,604	20.3	67.1	12.6
	1914	39	5	7	114	85	11	18	74.6	9.0	15.8	628,644	438,071	59,883	130,630	69.7	9.5	20.8
Minnesota.....	1919	.....	6	.....	16	.....	16	.....	100.0	.....	.....	89,016	.....	89,016	.....	100.0	.....	.....
	1914	.....	6	1	14	.....	14	.....	100.0	.....	.....	85,705	.....	85,705	.....	100.0	.....	.....
All other states <sup>1</sup> .....	1919	3	16	1	6,517	167	6,450	.....	1.0	99.0	.....	159,726,426	1,529,893	159,126,563	.....	0.3	99.7	.....
	1914	4	20	4	3,472	14	3,439	19	0.4	99.0	0.5	42,829,728	50,751	42,665,370	113,607	0.1	99.6	0.3

<sup>1</sup> Includes the group "All others" to avoid disclosure of individual operation.

TABLE 8.—NUMBER AND HORSEPOWER OF TYPES OF PRIME MOVERS: 1919, 1914, AND 1909.

POWER.	NUMBER OF ENGINES OR MOTORS.						HORSEPOWER.						Per cent distribution.		
	1919			1914			1909			Amount.			1919		
	1919	1914	1909	1919	1914	1909	1919	1914	1909	1919	1914	1909	1919	1914	1909
Primary power, total.....	283	259	259	52,846	41,630	28,257	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Owned.....															
Steam.....	141	167	248	48,451	38,998	28,069	91.7	94.1	90.3	.....	.....	.....	.....	.....	.....
Engines.....	120	151	164	47,576	38,003	27,835	90.0	91.3	98.5	.....	.....	.....	.....	.....	.....
Turbines.....	101	(2)	(2)	19,285	(2)	(2)	36.5	.....	.....	.....	.....	.....	.....	.....	.....
Internal-combustion engines.....	19	(2)	(2)	28,291	(2)	(2)	53.5	.....	.....	.....	.....	.....	.....	.....	.....
Water wheels, turbines, and motors.....	13	5	3	345	102	49	0.7	0.7	0.2	.....	.....	.....	.....	.....	.....
8	11	8	630	893	1,185	1.0	2.1	0.6	.....	.....	.....	.....	.....	.....	.....
Rented.....	142	92	11	4,395	2,641	188	8.3	5.9	0.7	.....	.....	.....	.....	.....	.....
Electric.....	142	92	11	3,585	2,456	163	6.8	5.9	0.6	.....	.....	.....	.....	.....	.....
Other.....	.....	.....	.....	810	185	25	1.5	1.5	0.1	.....	.....	.....	.....	.....	.....
Electric.....	2,998	2,131	1,070	47,735	29,276	27,230	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Rented.....	142	92	11	3,585	2,456	163	9.1	8.4	0.6	.....	.....	.....	.....	.....	.....
Generated by establishments reporting.....	2,856	2,039	1,059	44,150	26,820	27,067	90.9	91.6	99.4	.....	.....	.....	.....	.....	.....

<sup>1</sup> Figures for horsepower include for 1909 the amount reported under the head of "Other" owned power.<sup>2</sup> Figures not available.

TABLE 9.—FUEL CONSUMED, BY STATES: 1919 AND 1914.

STATE.	Cen-	sus-	COAL.				STATE.	Cen-	sus-	COAL.					
			Anthra-	Bitumi-	Coke	Fuel				Anthra-	Bitumi-	Coke			
			cite	nous	(tons,	oils				cite	nous	(tons,	Fuel	Gaso-	
			(tons,	(tons,	2,000	barrels).				(tons,	(tons,	2,000	barrels).	line	
United States.....	1919	113,141	859,133	14,822	17,518	28	23,335	Minnesota.....	1919	.....	682	.....	.....	.....	.....
	1914	101,240	648,430	1,054	6,290	.....	276		1914	.....	468	.....	.....	.....	.....
Iowa.....	1919	474	166,018	586	17,518	.....	.....	All other states <sup>1</sup> .....	1919	112,394	686,597	14,236	21	23,315	191
	1914	.....	144,805	41	6,156	.....	85		1914	101,048	501,836	1,013	144	.....	.....
Maine.....	1919	273	5,836	.....	.....	7	.....								
	1914	192	1,321	.....	30	.....	.....								

<sup>1</sup> All other states embrace, for 1919: Connecticut, 1 establishment; Florida, 1; Illinois, 4; Indiana, 3; Kentucky, 1; Massachusetts, 1; Michigan, 2; Missouri, 1; Nebraska, 1; New Jersey, 2; New York, 1; Ohio, 1; Oregon, 1. For 1914: California, 1; Connecticut, 1; Florida, 1; Illinois, 5; Indiana, 3; Maryland, 1; Massachusetts, 4; Michigan, 1; Missouri, 1; New Jersey, 1; New York, 2; Ohio, 2; Pennsylvania, 1; Wisconsin, 1.

# GLUCOSE AND STARCH INDUSTRY.

7

## SPECIAL STATISTICS.

Special statistics relating to materials and products.—Detail statistics relating to quantity and value of products and kind and cost of materials used are shown in Tables 11 and 12.

TABLE 10.—DETAILED STATISTICS OF QUANTITY AND VALUE: 1919, 1914, AND 1909.

PRODUCT.	1919	1914	1909	PRODUCT.	1919	1914	1909
Total value.....	\$186,256,260	\$52,615,401	\$48,799,311	Grape sugar:			
Starch:				Pounds.....	157,276,442	174,368,818	159,060,478
Pounds.....	783,513,057	620,764,347	677,555,647	Value.....	\$9,314,377	\$3,765,515	\$3,620,516
Value.....	\$44,402,873	\$15,783,781	\$17,514,823	Corn oil:			
Corn:				Gallons.....	12,516,261	8,861,579	8,104,175
Pounds.....	727,962,234	574,247,697	638,825,366	Value.....	\$20,332,249	\$3,633,163	\$2,802,768
Value.....	\$40,557,600	\$13,784,654	\$15,962,916	Corn-oil cake and meal:			
Potato—				Pounds.....	61,661,977	143,001,065	(2)
Pounds.....	16,477,186	23,540,472	24,873,415	Value.....	\$1,842,427	\$1,823,305	(2)
Value.....	\$1,094,028	3718,006	\$523,019	Dextrose:			
Other starches—				Pounds.....	28,757,233	(2)	(2)
Pounds.....	39,073,667	22,976,178	13,836,866	Value.....	\$1,838,500	(2)	(2)
Value.....	\$2,746,185	\$1,281,121	\$728,888	Stock feed, value.....	\$26,068,185	\$6,699,412	\$6,012,968
Glucose (including all sirups).....	\$80,608,100	\$18,541,429	\$17,922,514	All other products, value.....	\$1,847,949	\$2,311,762	\$924,422

<sup>1</sup> In addition, starches to the value of \$47,330 were reported by establishments engaged primarily in other industries.

<sup>2</sup> Not reported separately.

TABLE 11.—KIND AND COST OF MATERIALS: 1919, 1914, AND 1909.

MATERIAL.	1919	1914	1909	MATERIAL.	1919	1914	1909
Total cost.....	\$130,328,848	\$40,207,592	\$36,808,771	Wheat flour:			
Corn:				Pounds.....	1,768,932	14,198,049	19,545,824
Pounds.....	3,636,601,683	2,488,792,405	2,240,505,915	Cost.....	\$88,433	\$301,560	\$482,263
Cost.....	\$100,161,185	\$30,207,562	\$20,674,779	Cornstarch:			
Potatoes:				Pounds.....	22,860,680	9,812,659	105,299,010
Pounds.....	129,505,745	169,878,784	210,608,127	Cost.....	\$1,035,773	\$189,296	\$1,763,173
Cost.....	\$764,247	\$498,015	\$541,359	All other materials, including fuel			
Wheat:				and rent of power, cost.....	\$27,561,640	\$9,011,159	\$7,437,197
Pounds.....	11,162,340	.....	.....				
Cost.....	\$417,570	.....	.....				

## GENERAL TABLES.

Comparative summary.—Table 12 gives for 1919, 1914, and 1909 the number of establishments, average number of wage earners, primary horsepower, wages, cost of materials, and value of products for Iowa, Maine, and Minnesota. Other states engaged in this industry can not be shown for 1914 and 1909 without disclosing individual operations.

Detailed statement by states: 1919.—Table 13 presents for 1919 statistics in detail for each state for which figures can be shown without disclosing the operations of individual establishments.

TABLE 12.—COMPARATIVE SUMMARY, BY STATES: 1919, 1914, AND 1909.

STATE.	Cen-	Num-	Wage	Pri-	Wages.	Cost of	Value of		STATE.	Cen-	Num-	Wage	Pri-	Wages.	Cost of	Value of		
			ear-	horse-	ma-	ma-	duc-						power.	ma-	ma-	ma-	duc-	
			gan-	power.	ma-	ma-	duc-							ma-	ma-	ma-	duc-	
			ber	num-	ma-	ma-	duc-							ber	ber	ber	duc-	
			ber	ber	ber	ber	ber							ber	ber	ber	ber	
United States.....	1919	56	7,795	52,846	\$11,962	\$130,329	\$186,256	Expressed in thousands.	Maine.....	1919	26	255	858	\$298	\$1,178	\$1,722		
	1914	89	4,509	41,639	3,550	40,208	52,615		1914	51	114	1,550	56	4,847	629			
	1909	118	4,773	28,257	2,666	36,899	48,799		Minnesota.....	1919	6	16	263	15	68	89		
Iowa.....	1919	4	1,007	8,418	1,498	17,641	24,680		1914	7	14	292	9	62	86			
	1914	3	909	7,900	639	7,000	9,071		All other states <sup>1</sup> .....	1919	20	6,517	43,307	10,151	111,442	159,726		
									1914	28	3,472	31,798	2,846	28,299	42,829			

<sup>1</sup> All other states embrace, for 1919: Connecticut, 1 establishment; Florida, 1; Illinois, 4; Indiana, 3; Kentucky, 1; Massachusetts, 1; Michigan, 2; Missouri, 1; Nebraska, 1; New Jersey, 2; New York, 1; Ohio, 1; Oregon, 1. For 1914: California, 1; Connecticut, 3; Florida, 1; Illinois, 5; Indiana, 3; Maryland, 1; Massachusetts, 4; Michigan, 1; Missouri, 1; Nebraska, 1; New Jersey, 1; New York, 2; Ohio, 2; Pennsylvania, 1; Wisconsin, 1.

## MANUFACTURES.

TABLE 13.—DETAILED STATEMENT FOR THE INDUSTRY, BY STATES: 1919.

STATE.	Number of establish- ments.	PERSONS ENGAGED IN THE INDUSTRY.							WAGE EARNERS DEC. 15, OR NEAREST REPRESENTATIVE DAY.				EXPENSES.				
		Total.	Propri- etors and firm mem- bers,	Sala- ried offi- cers, super- in- tend- ents, and man- agers.	Clerks, etc.		Wage earners.		Number, 15th day of—	16 and over.		Under 16.		Salaries and wages.			
					Male.	Fe- male.	Average number	Maximum month.	Minimum month.	Male.	Fe- male.	Male.	Fe- male.				
United States....	56	8,694	37	397	328	137	7,795	Se 9,116	Jy 5,950	9,737	8,796	933	7	1	\$58,182,682	\$1,337,247	\$875,115
Iowa.....	4	1,168	—	34	93	34	1,007	Ja 1,431	De 763	1,216	1,183	33	—	—	10,548,184	239,476	373,388
Maine.....	26	267	28	9	3	2	255	Ap. 547	Au 67	666	612	49	5	—	931,298	18,142	3,655
Minnesota.....	6	31	—	14	1	—	16	Ap. 37	Au 6	32	31	1	—	—	152,198	2,289	53
All other states <sup>1</sup> ....	20	7,198	9	340	231	101	6,517	—	—	7,823	6,970	850	2	1	46,551,002	1,077,349	494,019
EXPENSES—continued.															POWER.		
STATE.	Salaries and wages—Con.	Wage earners.	For contract work.	Rent and taxes.		For materials.		Value of products.	Value added by manufacture.	Total.	Primary horsepower.		Owned.	Electric horse- power generated in estab- lish- ments report- ing.			
				Rent of factory.	Taxes, Federal, state, county, and local.	Principal materials.	Fuel and rent of power.				Steam engines (not tur- bines).	Steam tur- bines.	Inter- com- bus- tion en- gines.	Water- pow- er. <sup>2</sup>	Rent- ed. <sup>3</sup>		
United States....	\$11,932,483	\$551	\$12,867	\$4,021,457	\$126,626,568	\$3,702,280	\$186,256,260	\$55,927,412	52,846	19,285	28,291	345	530	4,305	44,150		
Iowa.....	1,498,247	—	344	1,612,199	17,012,556	628,815	24,688,750	7,047,379	8,418	1,741	4,759	4	—	1,914	5,532		
Maine.....	297,962	416	8,690	20,221	1,095,377	82,477	1,752,068	574,214	858	420	—	68	130	240			
Minnesota.....	14,953	135	68	8,352	62,230	5,320	89,016	21,466	203	252	—	3	—	8			
All other states <sup>1</sup> ....	10,151,321	—	3,765	2,380,685	108,456,405	2,985,668	159,726,426	48,284,353	43,307	16,872	23,532	270	400	2,233	38,598		

<sup>1</sup> All other states embrace, Connecticut, 1 establishment; Florida, 1; Illinois, 4; Indiana, 3; Kentucky, 1; Massachusetts, 1; Michigan, 2; Missouri, 1; Nebraska, 1; New Jersey, 2; New York, 1; Ohio, 1; Oregon, 1.

<sup>2</sup> Includes water wheels and turbines (irrespective of ownership of water supply) and water motors (operated by water from city mains).

<sup>3</sup> Chiefly electric motors operated by rented (or purchased) current; other power included (chiefly shaft-belt or transmitted power from neighboring power plants).



DEPARTMENT OF COMMERCE  
BUREAU OF THE CENSUS  
WASHINGTON

FOURTEENTH CENSUS OF THE UNITED STATES  
MANUFACTURES: 1919

# MANUFACTURED ICE

Prepared under the supervision of EUGENE F. HARTLEY, Chief Statistician for Manufactures

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1922

## EXPLANATION OF TERMS.

**Scope of census.**—Census statistics of manufactures are compiled primarily for the purpose of showing the absolute and relative magnitude of the different branches of industry covered and their growth or decline. Incidentally, the effort is made to present data throwing light upon character of ownership, size of establishments, and similar subjects. When use is made of the statistics for these purposes it is imperative that due attention be given to their limitations, particularly in connection with any attempt to derive from them figures purporting to show average wages, cost of production, or profits.

The census did not cover establishments which were idle during the entire year or for which products were valued at less than \$500, or the manufacturing done in educational, eleemosynary, and penal institutions.

**Period covered.**—The returns relate to the calendar year 1919, or the business year which corresponded most nearly to that calendar year, and cover a year's operations, except for establishments which began or discontinued business during the year.

**The establishment.**—As a rule, the term "establishment" represents a single plant or factory, but in some cases it represents two or more plants which were operated under a common ownership or for which one set of books of account was kept. If, however, the plants constituting an establishment as thus defined were not all located within the same city, county, or state, separate reports were secured in order that the figures for each plant might be included in the statistics for the city, county, or state in which it was located. In some instances separate reports were secured for different industries carried on in the same establishment.

**Classification by industries.**—The establishments were assigned to the several classes of industries according to their products of chief value. The products reported for a given industry may thus, on the one hand, include minor products different from those covered by the class designation, and, on the other hand, may not represent the total product covered by this designation, because some products of this class may be made in establishments in which it is not the product of chief value.

**Influence of increased prices.**—In comparing figures for cost of materials, value of products, and value added by manufacture in 1919 with the corresponding figures for earlier censuses, account should be taken of the general increase in the prices of commodities during recent years. To the extent to which this factor has been influential the figures fail to afford an exact measure of the increase in the volume of business.

**Persons engaged in the industry.**—The following general classes of persons engaged in the manufacturing industries were distinguished: (1) Proprietors and firm members, (2) salaried officers of corporations, (3) superintendents and managers, (4) clerks (including other subordinate salaried employees), and (5) wage earners.

The number of persons engaged in each industry, segregated by sex, and, in the case of wage earners, also by age (whether under 16 or 16 and over), was reported for a single representative day. The 15th of December was selected as representing for most industries normal conditions of employment, but where this date did not portray such conditions, an earlier date was requested.

In the case of employees other than wage earners the number thus reported for the representative date has been treated as equivalent to the average for the year, since the number of employees of this class does not ordinarily vary much from month to month. In the case of wage earners the average has been obtained in the manner explained in the next paragraph.

In addition to the more detailed report by sex and age of the number of wage earners on the representative date, a report was obtained of the number employed on the 15th of each month, by sex, without distinction of age. From these figures the average number of wage earners for the year has been calculated by dividing the sum of the numbers reported for the several months by 12. The importance of the industry as an employer of labor is believed to be more accurately measured by this average than by the number employed at any one time or on a given day.

The number of wage earners reported for the representative day, though given in certain tables for each separate industry, is not totaled for all industries combined, because, in view of the variations of date, such a total is not believed to be significant. It would involve more or less duplication of persons working in different industries at different times, would not represent the total number employed in all industries at any one time, and would give an undue weight to seasonal industries as compared with industries in continual operation.

In order to determine as nearly as possible the age distribution of the average number of wage earners for an industry, the per cent distribution by age of the wage earners for December 15, or the nearest representative day, has been calculated from the actual numbers reported for that date. The percentages thus obtained have been applied to the average number of wage earners for the year to determine the average numbers 16 years and over, and under 16, employed.

**Salaries and wages.**—Under these heads are given the total payments during the year for salaries and wages, respectively. The Census Bureau has not undertaken to calculate the average annual earnings of either salaried employees or wage earners. Such averages would possess little real value, because they would be based on the earnings of employees of both sexes, of all ages, and of widely varying degrees of skill. Furthermore, so far as wage earners are concerned, it would be impossible to calcu-

late accurately even so simple an average as this, since the number of wage earners fluctuates from month to month in every industry, and in some cases to a very great extent. The Census Bureau's figures for wage earners, as already explained, are averages based on the number employed on the 15th of each month, and while representing the number according to the pay rolls to whom wages were paid on that date, no doubt represent a larger number than would be required to perform the work in any industry if all were continuously employed during the year.

**Prevailing hours of labor.**—No attempt was made to ascertain the number of wage earners working a given number of hours per week. The inquiry called merely for the prevailing practice followed in each establishment. Occasional variations in hours in an establishment from one part of the year to another were disregarded, and no attention was paid to the fact that a few wage earners might have hours differing from those of the majority. All the wage earners of each establishment are therefore counted in the class within which the establishment itself falls. In most establishments, however, practically all the wage earners work the same number of hours, so that the figures give a substantially correct representation of the hours of labor.

**Capital (amount actually invested).**—The instructions on the schedule for securing data relating to capital were as follows:

"The answer should show the total amount of capital, both owned and borrowed, on the last day of the business year reported. All the items of fixed and live capital may be taken at the amounts carried on the books. If land or buildings are rented, that fact should be stated and no value given. If a part of the land or buildings is owned, the remainder being rented, that fact should be so stated and only the value of the owned property given. Do not include securities and loans representing investments in other enterprises."

These instructions were identical with those employed at the censuses of 1914 and 1909. The data compiled in respect to capital, however, at both censuses, as well as at all preceding censuses of manufactures, have been so defective as to be of little value except as indicating general conditions. In fact, it has been repeatedly recommended by the census authorities that this inquiry be omitted from the schedule. While there are some establishments whose accounting systems are such that an accurate return for capital could be made, this is not true of the great majority, and the figures therefore do not show the actual amount of capital invested.

**Materials.**—The statistics as to cost of materials relate to the materials used during the year, which may be more or less than the materials purchased during the year. The term "materials" covers fuel, rent of power and heat, mill supplies, and containers, as well as materials which form a constituent part of the product.

**Rent and taxes.**—The taxes include certain Federal taxes and state, county, and local taxes. Under "Federal taxes" there are included the internal revenue tax on manufactures (tobacco, beverages, etc.), excise taxes when included in values reported for products, corporation capital stock tax, and corporation income tax, but not the income tax for individuals and partners.

**Value of products.**—The amounts given under this heading represent the selling value or price at the factory of all products manufactured during the year, which may differ from the value of the products sold.

**Value added by manufacture.**—The value of products is not always a satisfactory measure of either the absolute or the relative importance of a given industry, because only a part of this value is actually created by the manufacturing processes carried on in the industry itself. Another part, and often by far the larger one, represents the value of the materials used. For many purposes, therefore, the best measure of the importance of an industry, from a manufacturing standpoint, is the value created by the manufacturing operations carried on within the industry. This value is calculated by deducting the cost of the materials used from the value of the products. The figure thus obtained is termed in the census reports "value added by manufacture."

**Cost of manufacture and profits.**—The census data do not show the entire cost of manufacture, and consequently can not be used for the calculation of profits. No account has been taken of depreciation or interest, rent of offices and buildings other than factory or works, insurance, ordinary repairs, advertising, and other sundry expenses.

**Primary horsepower.**—This item represents the total primary power equipment of the manufacturing establishments plus the amount of power, principally electric, rented from other concerns. It does not cover the power of electric motors taking their current from dynamos driven by primary power machines operated by the same establishment, because the inclusion of such power would obviously result in duplication. The figures for primary horsepower represent the rated capacity of the engines, motors, etc., and not the amount of power in actual daily use.

**Fuel.**—Statistics of the quantity of fuel used are shown only for anthracite and bituminous coal, coke, fuel oils, gasoline and other volatile oils, and gas, and represent the quantity used during the year. As only the principal kinds of fuel are shown, comparison as to the total cost of all fuel is impracticable.

# MANUFACTURED ICE.

## GENERAL STATISTICS.

**General character of the industry.**—The statistics for this industry represent the manufacture of ice for sale. Data for cold storage and refrigeration were not obtained at this census, except in some instances, where the manufacture of ice and the cold storage or refrigeration were carried on in the same establishment and it was impossible to segregate the data, the figures given cover the entire operations of such establishments.

Ice was also made in establishments engaged primarily in the manufacture of other products, to the value of \$12,510,832 in 1919 and \$6,934,086 in 1914. The value of such manufactures, however, is not included in the total value of products shown for the manufactured ice industry.

**Comparative summary.**—Table 1 summarizes the statistics for each census since 1899, with percentages of increase for each five-year period. With few exceptions increases are noticeable at each succeeding census. The large increases, however, from 1914 to 1919, in salaries and wages, cost of materials, and value of products are due largely to a general rise of prices and wages following the World War, and do not, therefore, fairly measure the growth of the industry for that period. A truer index of conditions is found in the average number of wage earners and primary horsepower. The addition of the Federal income tax since 1914 will account for the increase in "Rent and taxes."

**Principal states, ranked by value of products.**—New York, as shown by Table 2, reported the greatest value of products in 1919 but in average number of wage earners was outranked by Pennsylvania and Texas, the latter state, as in 1914 and 1909, lead in the number of establishments.

**Persons engaged in the industry.**—The classification, by sex, for 1919 was reported separately, but for 1914 and 1909 was obtained in the same manner as the distribution by age. The age classification of the average number of wage earners in Table 3 is an estimate obtained by the method described in the "Explanation of terms," page 2. Figures by states will be found in Table 17.

**Wage earners, by months, for states.**—As shown by Table 4, the number of wage earners employed in the industry month by month ranged from a maximum of 41,078 in July to a minimum of 20,796 in January, the minimum number being equivalent to 50.6 per cent of the maximum. Figures are given separately for all states reporting an average of over 500 wage earners, while for the United States the number of males and females is also shown.

**Average number of wage earners, by prevailing hours of labor per week, for states.**—Table 5 shows

a marked shortening of the working day for the industry since 1914. In that year only 5.5 per cent of the average number of wage earners were reported as employed less than 55 hours per week as against 23.4 per cent in 1919. Due to the nature of the industry a large proportion is reported in the "Over 60" group. In many large establishments two shifts working 12 hours each are employed 6 days in the week.

**Size of establishments, by average number of wage earners, for states.**—Analysis of Table 6 discloses the significant fact that in 1919, 1,589 establishments, or 55.4 per cent of the total number for the industry, employed less than 6 wage earners each, while only 4,236, or 14 per cent of the total number of wage earners, were employed therein, evidencing the predominance of the small establishments based on the average number of wage earners.

**Size of establishments, by value of products.**—At the censuses of 1909 and 1914 establishments with products valued at "\$100,000 to \$1,000,000" constituted one group, but at the census of 1919 this group was subdivided into "\$100,000 to \$500,000," and "\$500,000 to \$1,000,000." Table 7, therefore, gives combined figures for these two groups for 1909 and 1914.

**Character of ownership, by states.**—Table 8 emphasizes the predominance of the corporate form of ownership. Corporations owned 66.7 per cent of the total number of establishments in 1919, employed 86.6 per cent of the total average number of wage earners, and reported 87.4 per cent of the value of products. During the five-year period 1914 to 1919 the average number of wage earners in corporations increased 6,664, or 34.1 per cent, and the value of products \$67,741,474, or 130.3 per cent.

**Number and horsepower of types of prime movers.**—From 1914 to 1919, as shown by Table 9, there was an increase in the total horsepower for the industry of 110,982 horsepower, or 24 per cent, due principally to an increase of 103,447 horsepower, or 356.8 per cent, in rented electric power, while owned power increased only 7,540 horsepower, or 1.8 per cent, during the five-year period.

**Fuel consumed, by states.**—Table 10 shows the principal kinds of fuel used for the industry in the United States in 1919 and 1914, and also gives separately the amounts consumed in states requiring considerable quantities of fuel for manufacturing purposes. Anthracite coal is naturally consumed in the Eastern states, and three states, New York, New Jersey, and Pennsylvania combined, reported 85.1 per cent of this kind of coal used by the industry in 1919.



# MANUFACTURED ICE.

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TABLE 4.—WAGE EARNERS, BY MONTHS, FOR STATES: 1919.

[The month of maximum employment is indicated by bold-faced figures and that of minimum employment by *italic* figures.]

STATE.	Average number employed during year.	NUMBER EMPLOYED ON 15TH DAY OF THE MONTH OR NEAREST REPRESENTATIVE DAY.												Per cent minimum is of maximum.
		January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	
United States:														
1919.....	30,247	<b>20,796</b>	21,408	23,275	27,310	31,644	37,788	41,078	40,977	37,900	31,834	25,631	23,224	50.6
Males.....	30,005	<b>20,604</b>	21,213	23,056	27,102	31,370	37,524	40,773	40,673	37,716	31,615	25,413	23,001	50.5
Females.....	242	<i>192</i>	195	219	208	274	294	305	304	283	219	218	223	63.0
1914.....	23,011	<b>15,144</b>	15,660	17,128	21,023	25,688	30,825	32,526	32,104	28,306	23,065	18,085	15,990	46.6
1909.....	10,114	<i>9,847</i>	10,008	11,803	14,917	18,061	20,875	22,872	22,644	21,403	16,526	13,020	11,392	43.1
Alabama.....	553	361	<i>357</i>	393	500	588	680	726	759	726	614	518	414	47.0
Arkansas.....	525	<i>207</i>	300	363	409	578	673	835	775	717	545	410	332	35.6
California.....	1,535	<b>1,177</b>	1,190	1,269	1,420	1,560	1,695	1,938	1,927	1,829	1,747	1,396	1,272	60.7
Florida.....	1,412	<b>1,512</b>	1,345	1,401	1,373	1,407	1,415	1,457	1,400	1,548	1,472	1,366	1,447	84.7
Georgia.....	1,115	<i>965</i>	971	985	1,020	1,130	1,174	1,320	1,294	1,283	1,190	1,056	902	73.1
Illinois.....	1,081	<b>1,084</b>	1,131	1,321	1,508	1,676	1,989	2,252	2,303	2,164	1,919	1,477	1,288	47.1
Indiana.....	856	<b>488</b>	515	504	732	831	1,142	1,321	1,311	1,172	877	672	605	36.9
Iowa.....	504	<i>535</i>	521	479	322	405	556	717	712	636	503	349	313	43.7
Kansas.....	822	<b>458</b>	487	501	685	875	1,007	1,266	1,309	1,151	841	617	517	35.0
Kentucky.....	754	<i>451</i>	420	496	660	844	1,059	1,140	1,129	990	788	572	409	36.8
Louisiana.....	785	600	<i>599</i>	631	750	843	968	<b>1,003</b>	988	951	775	673	630	50.7
Maryland.....	632	<b>426</b>	434	475	577	704	806	851	859	793	686	520	453	49.6
Michigan.....	742	<i>460</i>	678	510	616	762	936	<b>1,084</b>	1,027	854	628	560	780	42.4
Missouri.....	1,174	<b>768</b>	817	932	1,141	1,267	1,467	1,630	1,642	1,522	1,243	899	766	46.4
New Jersey.....	838	<i>648</i>	572	610	712	875	1,060	1,064	1,123	1,042	855	756	700	50.9
New York.....	2,138	<b>1,631</b>	1,632	1,777	1,954	2,212	2,581	2,028	2,664	2,490	2,350	1,905	1,842	57.5
North Carolina.....	757	<i>605</i>	510	543	721	886	908	1,031	1,006	966	749	616	549	48.8
Ohio.....	1,952	<b>1,148</b>	1,148	1,311	1,648	1,952	2,847	2,959	2,804	2,540	2,060	1,559	1,349	38.8
Oklahoma.....	831	<i>469</i>	487	559	712	895	1,081	1,204	1,338	1,172	827	590	543	35.1
Pennsylvania.....	2,733	<i>1,003</i>	1,957	2,133	2,527	2,806	3,673	3,603	3,506	3,398	2,803	2,397	2,000	51.8
South Carolina.....	584	<i>586</i>	388	421	514	649	737	773	791	732	613	527	477	48.8
Tennessee.....	1,063	<i>691</i>	712	787	979	1,192	1,412	1,508	1,551	1,284	1,060	831	740	44.6
Texas.....	2,362	<b>1,627</b>	1,556	1,768	2,155	2,553	2,935	3,256	3,306	3,034	2,457	2,001	1,797	46.2
Virginia.....	909	<i>650</i>	641	724	864	1,032	1,212	1,459	1,231	1,199	1,053	822	732	43.9

TABLE 5.—AVERAGE NUMBER OF WAGE EARNERS, BY PREVAILING HOURS OF LABOR PER WEEK, FOR STATES: 1919 AND 1914.

STATE.	Census year.	Total.	IN ESTABLISHMENTS WHERE THE PREVAILING HOURS OF LABOR PER WEEK WERE—							
			44 and under.	Between 44 and 48.	48. <sup>1</sup>	Between 48 and 54.	54.	Between 54 and 60.	60.	Over 60.
United States.....	1919	30,247	215	7	4,781	302	1,720	5,880	4,177	13,105
	1914	23,011	(2)	(2)	518	57	664	2,182	3,741	15,819
	1909	16,114	(2)	(2)	305	30	283	965	2,007	12,524
Alabama <sup>2</sup> .....	1919	553	.....	.....	15	.....	24	25	85	404
Arkansas <sup>2</sup> .....	1919	525	5	.....	11	.....	25	40	82	382
California.....	1919	1,535	9	.....	516	14	177	627	40	148
	1914	1,139	(2)	(2)	25	2	4	464	314	830
Florida.....	1919	1,412	2	.....	98	10	16	205	39	1,042
	1914	760	(2)	(2)	17	2	39	120	44	538
Georgia.....	1919	1,115	.....	.....	11	.....	13	65 <sup>3</sup>	40	986
	1914	800	.....	.....	.....	.....	26	5	42	817
Illinois.....	1919	1,681	10	.....	161	86	28	700	827	389
	1914	1,312	(2)	(2)	22	.....	74	446	153	617
Indiana.....	1919	855	7	.....	13	.....	5	40	167	623
	1914	920	.....	.....	.....	.....	15	3	276	632
Iowa <sup>2</sup> .....	1919	504	.....	.....	14	4	126	203	111	46
Kansas.....	1919	822	6	3	176	.....	80	116	161	280
	1914	634	(2)	(2)	9	.....	21	.....	106	498
Kentucky.....	1919	754	1	.....	48	1	17	91	102	404
	1914	766	(2)	(2)	13	3	5	16	52	677
Louisiana.....	1919	786	.....	.....	55	.....	23	66	134	507
	1914	782	(2)	(2)	19	4	.....	6	107	646
Maryland.....	1919	632	(2)	(2)	1	.....	6	322	30	274
	1914	532	.....	.....	.....	.....	31	30	18	452

<sup>1</sup> Includes 48 and under for 1914 and 1909.

<sup>2</sup> Corresponding figures not available.

<sup>3</sup> Not shown separately in 1914.

## MANUFACTURES.

TABLE 5.—AVERAGE NUMBER OF WAGE EARNERS, BY PREVAILING HOURS OF LABOR PER WEEK, FOR STATES: 1919 AND 1914—Continued.

STATE.	Census year.	Total.	IN ESTABLISHMENTS WHERE THE PREVAILING HOURS OF LABOR PER WEEK WERE—								
			44 and under.	Between 44 and 48.	48. <sup>1</sup>	Between 48 and 54.	54.	Between 54 and 60.	60.	Over 60.	
Michigan <sup>2</sup> .	1919	742			605				65	25	47
Missouri.	1919	1,174			78	11	29	348	87	55	
	1914	1,059	(2)	(2)	18		10	83	148	800	
New Jersey.	1919	838			289	12	61	230	19	204	
	1914	621	(2)	(2)	16		36	104	87	378	
New York.	1919	2,138			1,187	140	179	94	367	148	
	1914	1,407	(2)	(2)	112	15	126	253	272	629	
North Carolina.	1919	757			91	3	6	6	273	377	
	1914	519	1					15	140	364	
Ohio.	1919	1,952			73	39	231	389	296	902	
	1914	1,277	(2)	(2)	95	7	24	129	311	701	
Oklahoma.	1919	831			27	18	126	149	53	458	
	1914	528	(2)	(2)	7		10	16	41	454	
Pennsylvania.	1919	2,733			216	9	118	702	601	1,082	
	1914	2,124	(2)	(2)	49	5	32	150	376	1,512	
South Carolina <sup>3</sup> .	1919	584			10		10	6	102	456	
Tennessee.	1919	1,063			34		7	11	125	885	
	1914	927	(2)	(2)	3		5	4	50	865	
Texas.	1919	2,362			359	10	243	343	201	1,189	
	1914	1,926	(2)	(2)	12		39	75	167	1,633	
Virginia.	1919	989			22	2	48	244	227	429	
	1914	714	(2)	(2)	2			16	150	546	

<sup>1</sup> Includes 48 and under for 1914 and 1909.<sup>2</sup> Corresponding figures not available.<sup>3</sup> Not shown separately in 1914.

TABLE 6.—SIZE OF ESTABLISHMENTS, BY AVERAGE NUMBER OF WAGE EARNERS, FOR STATES: 1919.

STATE.	TOTAL.		ESTABLISHMENTS EMPLOYING—																	
	Establishments.	Wage earners (average number).	No wage earners.			1 to 5 wage earners, inclusive.		6 to 20 wage earners, inclusive.		21 to 50 wage earners, inclusive.		51 to 100 wage earners, inclusive.		101 to 250 wage earners, inclusive.		251 to 500 wage earners, inclusive.		501 to 1,000 wage earners.		
			Establishments.	Establishments.	Wage earners.	Establishments.	Establishments.	Wage earners.	Establishments.	Establishments.	Wage earners.	Establishments.	Establishments.	Wage earners.	Establishments.	Establishments.	Wage earners.	Establishments.	Establishments.	Wage earners.
United States.....	1919.....	2,867	30,247	51	1,538	4,236	931	10,360	280	8,739	48	3,186	17	9,682	1	468	1	576		
	1914.....	2,543	23,011	23	1,453	4,168	824	8,935	201	6,024	33	2,211	9	1,673						
Alabama.....		59	553	2	25	63	27	291	4	127	1	72								
Arkansas.....		71	525		38	115	29	312	4	98										
California.....		117	1,535	5	57	129	35	351	14	511	5	345	1	199						
Florida.....		95	1,412	1	39	118	36	374	13	397	4	287	2	256						
Georgia.....		70	1,115		31	104	28	350	7	213	3	201	1	247						
Illinois.....		154	1,681		70	222	60	629	22	720	2	110								
Indiana.....		107	855	1	61	187	36	365	8	243	1	60								
Iowa.....		46	504	1	28	85	11	126	5	162			1	131						
Kansas.....		137	822	5	94	216	31	349	6	182	1	75			1	181				
Kentucky.....		99	754	2	62	181	32	343	2	49										
Louisiana.....		70	785	1	19	73	43	462	7	250										
Maryland.....		61	632	1	37	95	13	170	9	245			1	122						1 576
Michigan.....		18	742		9	27	6	74	2	65										
Missouri.....		129	1,174	2	85	200	31	343	8	234	1	98	2	299						
New Jersey.....		75	833		32	90	31	338	11	255			1	155						
New York.....		132	2,138	1	42	139	55	684	30	979	3	186	1	150						
North Carolina.....		63	757	1	28	84	20	226	13	394	1	53								
Ohio.....		141	1,952	5	69	219	51	548	11	373	3	228	1	116	1	408				
Oklahoma.....		115	831		68	180	39	358	6	152	2	111								
Pennsylvania.....		226	2,733	6	113	297	73	817	27	877	5	309	2	433						
South Carolina.....		54	584		29	102	18	222	6	205	1	55								
Tennessee.....		73	1,063	1	39	114	20	230	9	301	2	135	2	283						
Texas.....		265	2,362	3	158	472	78	916	22	738	4	236								
Virginia.....		106	969		59	148	34	365	11	288	1	58	1	110						

# MANUFACTURED ICE.

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TABLE 7.—SIZE OF ESTABLISHMENTS, BY VALUE OF PRODUCTS: 1919, 1914, AND 1909.

VALUE OF PRODUCT.	NUMBER OF ESTABLISHMENTS.			AVERAGE NUMBER OF WAGE EARNERS.			VALUE OF PRODUCTS.			VALUE ADDED BY MANUFACTURE.		
	1919	1914	1909	1919	1914	1909	1919	1914	1909	1919	1914	1909
All classes.....	2,867	2,543	2,004	30,247	23,011	16,114	\$137,004,793	\$60,386,207	\$42,953,055	\$94,127,289	\$42,631,263	\$31,635,557
Less than \$5,000.....	367	488	403	352	742	672	1,019,837	1,412,978	1,204,299	657,276	939,830	829,066
\$5,000 to \$20,000.....	1,013	1,208	973	3,211	5,599	4,558	11,654,111	13,100,305	10,748,796	7,350,855	9,122,568	7,881,271
\$20,000 to \$100,000.....	1,167	708	587	12,738	11,730	8,034	54,631,803	32,338,308	23,741,981	36,850,216	22,658,730	17,468,508
\$100,000 to \$500,000.....	306	78	41	{ 11,303 }	4,940	2,250	{ 56,258,222 }	13,534,676	7,257,979	{ 39,882,162 }	9,910,135	5,455,112
\$500,000 to \$1,000,000.....	10	1					{ 6,508,306 }			{ 4,395,123 }		
\$1,000,000 and over.....	4			1,330			6,932,519			4,991,667		
PER CENT DISTRIBUTION.												
All classes.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Less than \$5,000.....	12.8	19.2	20.1	1.2	3.2	4.2	0.7	2.3	2.8	0.7	2.2	2.6
\$5,000 to \$20,000.....	35.3	47.5	48.6	10.6	24.3	28.3	8.5	21.7	25.0	7.8	21.4	21.9
\$20,000 to \$100,000.....	40.7	30.2	29.3	42.1	51.0	53.6	39.9	53.6	55.3	39.1	53.1	55.2
\$100,000 to \$500,000.....	10.7	3.1	{ 1 }	{ 37.4 }	21.5	14.0	{ 41.1 }	22.4	16.9	{ 42.4 }	23.2	17.2
\$500,000 to \$1,000,000.....	0.3	{ 1 }	2.0	{ 4.3 }			{ 4.7 }			{ 4.7 }		
\$1,000,000 and over.....	0.1			4.4			5.1			5.3		

<sup>1</sup> Less than one-tenth of 1 per cent.

TABLE 8.—CHARACTER OF OWNERSHIP, BY STATES: 1919 AND 1914.

STATE.	Census year.	NUMBER OF ESTABLISHMENTS OWNED BY—	AVERAGE NUMBER OF WAGE EARNERS.						VALUE OF PRODUCTS.									
			In establishments owned by—			Per cent of total.			Of establishments owned by—			Per cent of total.						
			Total.	Individuals.	Corporations.	All others.	Individuals.	Corporations.	All others.	Total.	Individuals.	Corporations.	All others.	Individuals.				
United States.....	1919	545,1,911	411	30,247	2,061	26,183	2,003	6.8	86.6	6.6	\$137,004,793	\$8,825,646	\$119,718,423	\$8,460,729	6.4	87.4	6.2	
	1914	456,1,732	356	23,011	1,883	19,519	1,609	8.2	84.8	7.0	60,386,207	4,448,018	51,076,040	3,960,700	7.4	86.1	6.6	
	1909	330,1,387	287	16,114	1,471	13,433	1,180	9.1	83.5	7.3	42,953,055	3,495,344	36,701,422	2,750,280	8.1	85.4	6.4	
Alabama.....	1910	10	37	12	563	48	377	128	8.7	68.2	23.1	2,085,975	163,101	1,562,913	359,961	7.8	74.9	17.3
	1914	10	33	12	478	46	345	87	9.6	72.2	18.2	1,201,106	85,576	931,770	183,700	7.1	77.6	15.3
Arkansas.....	1910	14	45	12	525	68	368	89	13.0	70.1	17.0	2,132,331	257,698	1,592,748	281,885	12.1	74.7	13.2
	1914	9	41	15	424	27	320	77	6.4	75.5	18.2	1,114,551	66,463	835,884	132,204	6.0	77.7	16.8
California.....	1910	20	80	17	1,535	37	1,401	37	2.4	95.2	2.4	7,112,470	190,880	6,724,009	196,981	2.7	94.5	2.8
	1914	16	71	8	1,330	29	1,098	12	2.5	96.4	1.1	3,587,334	92,942	3,447,574	46,818	2.6	96.1	1.3
Florida.....	1910	20	63	12	1,412	102	1,218	92	7.2	86.3	0.5	4,051,518	271,211	3,495,611	284,694	0.7	80.3	7.0
	1914	14	68	12	700	58	650	52	7.6	85.5	2.0	2,202,769	138,364	1,916,727	144,678	6.3	87.2	6.6
Georgia.....	1910	8	50	12	1,115	51	1,003	61	4.0	90.0	5.5	4,440,220	280,986	3,963,442	195,801	0.3	89.3	4.4
	1914	20	44	10	890	84	758	48	9.4	85.2	5.4	2,034,984	195,044	1,758,860	110,080	9.5	85.2	5.3
Illinois.....	1910	21	127	6	1,681	112	1,536	33	6.7	91.4	2.0	10,093,263	376,304	9,558,273	158,686	3.7	94.7	1.6
	1914	23	100	5	1,312	122	1,164	26	9.3	88.7	2.0	3,388,862	271,611	3,039,901	77,260	8.0	80.7	2.3
Indiana.....	1910	16	73	18	855	54	718	83	0.3	84.0	9.7	4,080,300	213,353	3,540,404	326,573	5.2	86.8	8.0
	1914	22	65	19	920	66	723	107	10.4	78.1	11.0	2,029,250	213,747	1,594,513	220,990	10.5	78.6	10.9
Iowa.....	1910	4	28	14	504	13	430	61	2.6	85.3	12.1	1,841,012	46,810	1,513,918	280,287	2.5	82.2	15.2
	1914	6	24	4	192	13	171	8	6.8	89.1	4.2	578,924	36,252	511,773	30,899	6.3	88.4	5.3
Kansas.....	1910	39	64	34	822	74	656	92	9.0	70.8	11.2	3,500,107	309,870	2,821,105	378,132	8.8	80.4	10.8
	1914	19	66	16	634	52	519	63	8.2	81.9	0.9	1,794,737	169,430	1,507,100	128,267	8.9	84.0	7.1
Kentucky.....	1910	15	74	10	754	64	662	28	8.5	87.8	3.7	2,689,130	257,843	2,319,472	112,315	9.6	86.3	4.2
	1914	14	68	11	700	73	638	55	9.5	83.3	7.2	1,471,860	120,979	1,261,720	83,158	8.6	85.7	5.6
Louisiana.....	1910	12	55	3	785	81	665	39	10.3	84.7	5.0	3,900,334	329,686	3,518,856	141,792	8.3	88.2	3.6
	1914	13	58	5	782	78	633	71	10.0	80.9	0.1	1,902,071	170,373	1,657,143	134,555	8.7	84.5	6.9
Maryland.....	1910	18	35	8	632	46	556	30	7.3	88.0	4.7	2,717,377	204,509	2,361,665	151,116	7.5	86.0	5.0
	1914	10	33	13	532	43	430	50	8.1	82.5	0.4	1,502,983	87,771	1,356,294	118,918	5.6	86.8	7.6
Michigan.....	1910	1	13	4	742	—	719	23	—	100.0	3.1	2,821,688	—	2,685,800	135,883	—	95.2	4.8
	1914	1	10	4	443	1,443	—	—	—	100.0	—	704,956	—	704,956	—	—	100.0	—
Missouri.....	1910	28	79	22	1,742	72	1,064	48	0.1	89.8	4.1	6,504,840	351,252	5,968,732	184,856	5.4	91.8	2.8
	1914	17	71	29	1,059	73	890	87	6.9	84.9	8.2	3,106,895	179,624	2,739,470	187,801	5.8	88.2	6.0
New Jersey.....	1910	14	54	7	838	75	725	38	8.9	86.5	4.5	4,550,965	500,907	3,824,751	135,307	13.0	84.0	3.0
	1914	13	52	6	621	74	518	31	11.9	83.1	5.0	1,556,361	222,051	1,277,917	56,393	14.3	82.1	3.6
New York.....	1910	18	106	8	2,138	150	1,867	91	7.0	88.7	4.3	13,308,590	912,834	11,607,178	788,578	6.9	87.2	5.9
	1914	21	82	8	1,407	118	1,223	68	8.4	86.0	4.7	4,893,778	349,030	4,304,030	243,718	7.1	87.9	5.0
North Carolina.....	1910	10	48	5	767	36	705	16	4.8	93.1	2.1	2,305,122	118,141	2,196,375	50,606	5.0	92.9	2.1
	1914	7	44	10	519	36	462	21	6.9	89.0	4.0	1,125,814	36,500	1,034,878	54,486	3.2	91.9	4.8
Ohio.....	1910	34	88	19	1,952	148	1,730	74	7.6	88.6	3.8	10,208,061	578,198	9,334,473	295,390	5.7	91.4	2.9
	1914	21	91	20	1,277	117	1,117	43	9.2	87.5	3.4	3,134,302	247,085	2,729,927	150,600	7.9	87.1	5.0
Oklahoma.....	1910	15	79	21	831	30	736	65	3.0	88.6	7.8	3,574,481	111,862	3,191,482	271,087	3.1	89.3	7.6
	1914	10	69	18	528	25	435	68	4.7	82.4	12.9	1,604,146	70,958	1,336,356	190,832	4.8	83.3	11.9
Pennsylvania.....	1910	47	148	31	2,733	200	2,380	144	7.3	87.4	5.3	12,686,299	954,193	10,901,763	830,343	7.5	85.9	6.5
	1914	40	122	27	2,124	136	1,847	141	6.4	87.0								

## MANUFACTURES.

TABLE 9.—NUMBER AND HORSEPOWER OF TYPES OF PRIME MOVERS: 1919, 1914, AND 1909.

POWER.	NUMBER OF ENGINES OR MOTORS.			HORSEPOWER.					
				Amount.			Per cent distribution.		
	1919	1914	1909	1919	1914	1909	1919	1914	1909
Primary power, total.....	10,585	7,260	4,635	572,970	461,988	317,789	100.0	100.0	100.0
Owned.....	4,927	5,317	4,297	437,487	429,947	310,211	76.4	93.1	97.6
Steam <sup>1</sup> .....	4,434	5,013	4,170	406,942	414,685	304,685	71.0	89.8	95.9
Engines.....	4,324	(2)	(2)	393,312	(3)	(3)	68.6	-----	-----
Turbines.....	110	(2)	(2)	13,630	(3)	(3)	2.4	-----	-----
Internal-combustion engines.....	435	244	82	28,003	12,535	3,264	4.9	2.7	1.0
Water wheels, turbines, and motors.....	58	60	45	2,542	2,727	2,262	0.4	0.6	0.7
Rented.....	5,658	1,943	338	135,483	32,041	7,578	23.6	6.9	2.4
Electric.....	5,658	1,943	338	132,438	28,991	5,414	23.1	6.2	1.7
Other.....	-----	-----	-----	3,045	3,050	2,104	0.5	0.7	0.7
Electric.....	8,169	4,204	1,140	158,552	50,546	14,253	100.0	100.0	100.0
Rented.....	5,658	1,943	338	132,438	28,991	5,414	83.5	57.4	38.0
Generated by establishments reporting.....	2,511	2,281	802	26,114	21,555	8,839	16.5	42.6	62.0

<sup>1</sup> Figures for horsepower include for 1909 the amount reported under the head of "Other" owned power.

2 Not reported separately.

TABLE 10.—FUEL CONSUMED, BY STATES: 1919 AND 1914.

STATE.	Cen-	COAL.			Gasoline and other volatile oils (barrels).	Gas (1,000 cubic feet).	STATE.	COAL.			Cen-	Gasoline and other volatile oils (barrels).	Gas (1,000 cubic feet).	
		An-	thracite (tons, 2,240 lbs.).	Bitumi-				Anthracite (tons, 2,240 lbs.).	Bitumi-	nous (tons, 2,000 lbs.).				
United States.....	1919	205,875	3,309,636	32,327	1,622,473	11,076	6,170,964	Michigan.....	1919	13,285	-----	-----	-----	-----
	1914	213,541	3,386,275	30,493	1,292,008	(1)	7,592,003		1914	15	25,205	-----	25	(1) -----
Alabama.....	1919	-----	81,928	5,300	102	-----	-----	Missouri.....	1919	295,493	-----	141,324	114	2,683
	1914	-----	84,960	2,228	77	(1)	-----		1914	-----	317,521	(1)	5,589	108,447
Arkansas.....	1919	1,000	46,084	-----	4,896	51	677,858	New Jersey.....	1919	53,119	92,057	414	3,379	46
	1914	1,520	43,095	-----	482	(1)	564,063		1914	63,048	68,547	300	684	(1) -----
California.....	1919	-----	1	-----	322,530	470	71,600	New York.....	1919	71,655	181,928	8,124	12,805	145
	1914	-----	100	-----	588,536	(1)	560		1914	99,705	240,779	552	3,008	(1) 12,740
Florida.....	1919	9	38,713	777	146,605	1,843	1,320	North Carolina.....	1919	64,087	-----	200	93	(1) -----
	1914	1,000	52,533	9,600	40,208	(1)	-----		1914	232	50,540	-----	20	3,000
Georgia.....	1919	149,910	450	-----	447	-----	-----	Ohio.....	1919	256	251,850	2	1,645	422,734
	1914	132,344	-----	-----	14	(1)	-----		1914	309	230,011	4	315	828,456
Illinois.....	1919	1,302	259,087	600	375	47	74	Oklahoma.....	1919	992	33,460	60,916	343	1,893,013
	1914	-----	322,908	215	178	(1)	80		1914	-----	48,382	1,050	5,383	(1) 833,827
Indiana.....	1919	201,988	-----	211	103	-----	-----	Pennsylvania.....	1919	50,388	383,015	5,003	278	223,669
	1914	6	173,110	5,000	109	(1)	-----		1914	34,340	365,421	2,654	(1)	107,230
Iowa.....	1919	80	66,825	-----	2,765	-----	-----	South Carolina.....	1919	1,250	57,954	5,281	296	-----
	1914	-----	51,541	-----	2,121	(1)	-----		1914	525	45,711	300	14	(1) -----
Kansas.....	1919	8	94,086	725	79,735	883	343,426	Tennessee.....	1919	-----	147,690	560	24	63
	1914	-----	77,934	-----	34,734	(1)	771,973		1914	-----	130,069	-----	71	(1) -----
Kentucky.....	1919	119,709	-----	195	110	241,694	Texas.....	1919	7,133	184,012	21,822	528,865	2,646	980,332
	1914	136,330	-----	225	(1)	348,400		1914	1,660	240,747	2,022	412,171	(1)	2,603,568
Louisiana.....	1919	61,207	263	175,832	152	619,288	Virginia.....	1919	1,059	132,444	13	1,584	181	-----
	1914	2,753	99,638	48,973	(1)	278,697		1914	-----	103,482	3,000	205	(1)	-----
Maryland.....	1919	6,650	84,691	4,639	274	4,000	All other states.....	1919	9,984	267,925	3,519	111,207	814	676,533
	1914	3,395	92,403	319	(1)	12		1914	5,038	262,344	5,250	145,820	(1)	1,134,576

<sup>1</sup> Included in figures for fuel oils.

## MANUFACTURED ICE.

9

## SPECIAL STATISTICS.

**Detailed statistics of materials, products, and equipment.**—Certain additional detailed information concerning the quantity and cost of ammonia used, the quantity and value of products, and the equipment used, was collected, by means of a supplemental schedule, data for which are presented in Table 11.

The consumption of ammonia by establishments making ice as a subsidiary product was not shown prior to 1914. Of the cost of ammonia used in 1919, both in the industry proper and in industries in which ice was made as a subsidiary product, that of anhydrous ammonia represented 94.8 per cent of the total.

TABLE 11.—DETAILED STATISTICS OF QUANTITY, COST, AND VALUE: 1919, 1914, 1909, AND 1904.

	1919	1914	1909	1904
<b>QUANTITY AND COST OF AMMONIA USED.</b>				
Ammonia, total cost...	\$2,058,058	\$1,887,359	(1)	(1)
The ice industry.....	\$2,410,100	\$1,528,975	\$1,021,913	\$613,138
Other industries manufacturing ice as a subsidiary product .....	\$248,558	\$358,384	(1)	(1)
<b>Anhydrous:</b>				
Pounds.....	7,758,984	6,777,817	(1)	(1)
The ice industry.....	7,003,581	5,405,917	3,468,284	1,932,497
Other industries.....	755,403	1,371,700		
Used in—				
Compressor system.....	6,875,012	6,021,500	(1)	(1)
Absorption system.....	883,972	758,111		
Cost.....	\$2,619,427	\$1,777,095	(1)	(1)
The ice industry.....	\$2,274,880	\$1,421,190	\$920,505	\$522,275
Other industries.....	\$244,538	\$355,899	(1)	(1)
Aqua:				
Pounds.....	1,740,825	1,971,046	(1)	(1)
The ice industry.....	1,875,620	1,927,004	1,070,808	1,406,034
Other industries.....	65,109	43,882	(1)	(1)
Used in—				
Compressor system.....	94,102	1,971,046	(1)	(1)
Absorption system.....	1,646,723			
Cost.....	\$139,231	\$110,204	(1)	(1)
The ice industry.....	\$135,211	\$107,770	\$95,408	\$60,863
Other industries.....	\$4,020	\$2,485	(1)	(1)
<b>PRODUCTS.</b>				
Total value.....	\$140,515,630	\$67,320,353	\$47,202,845	\$25,080,957
The ice industry.....	\$137,004,798	\$60,380,207	\$42,953,055	\$23,700,045
Subsidiary products from other industries.....	\$12,510,832	\$6,934,086	\$4,240,700	\$1,899,912
<b>Ice:</b>				
Tons (2,000 pounds).....	27,048,483	21,043,063	14,280,208	8,014,137
The ice industry.....	26,202,846	18,324,601	12,647,949	7,109,448
Other industries.....	2,655,617	2,718,372	1,582,269	814,689
Value.....	\$138,795,342	\$62,192,418	\$44,130,058	\$24,350,415
The ice industry.....	\$126,284,510	\$65,258,327	\$39,880,203	\$22,450,503
Other industries.....	\$12,510,832	\$6,934,086	\$4,240,700	\$1,899,912
By kinds—				
Can ice—				
Tons.....	28,577,037	10,635,308	13,177,901	(1)
The ice industry.....	24,083,032	17,145,609	11,671,647	6,695,789
Other industries.....	2,404,005	2,489,700	1,506,444	(1)
Value.....	\$133,082,307	\$58,593,861	\$41,123,901	(1)
The ice industry.....	\$121,135,615	\$52,150,188	\$37,085,533	\$21,020,547
Other industries.....	\$11,846,092	\$6,443,373	\$4,038,368	(1)
Plate ice—				
Tons.....	1,370,826	1,407,605	1,052,217	(1)
The ice industry.....	1,209,214	1,179,002	976,402	503,659
Other industries.....	161,612	228,603	75,815	(1)
Value.....	\$5,713,035	\$3,508,652	\$3,015,152	(1)
The ice industry.....	\$5,048,805	\$3,107,830	\$2,803,730	\$1,429,956
Other industries.....	\$664,140	\$490,717	\$211,422	(1)
Cold-storage receipts.....	\$7,142,098	\$5,127,94	\$3,063,702	\$1,339,542
All other products.....	\$3,577,200			
<b>EQUIPMENT.</b>				
Machines:				
Number.....	5,223	4,949		
Capacity, tons (per day of 24 hours).....	260,170	120,098	(1)	(1)
Storage space, cubic feet:				
For ice storage.....	115,313,000	100,574,000		
For cold storage.....	78,953,000	82,694,000		

<sup>1</sup> Figures not available.

The total value of products given in the table includes receipts from cold storage and refrigeration by establishments in the ice industry proper, but does not include receipts from this source by establishments making ice as a subsidiary product. The value of ice produced in establishments engaged primarily in its manufacture increased \$71,026,183, or 128.5 per cent, between 1914 and 1919 as compared with \$15,369,064, or 38.5 per cent, between 1909 and 1914. The percentages of increase in quantities for the same periods were 38 and 44.9, respectively. The output of ice by establishments manufacturing it as a subsidiary product constituted 9.5 per cent of the total production in 1919 against 12.9 per cent in 1914.

Of the total number of machines in use, 4,523, or 85 per cent, with a combined capacity of 232,359 tons per day of 24 hours, or an average of 51 tons per machine, were reported by establishments manufacturing ice as their principal product, and 800, or 15 per cent, with a daily capacity of 36,820 tons, or an average of 46 tons per machine, by establishments making ice as a subsidiary product.

**Quantity and value of manufactured ice, by states.**—Table 12 shows for 1919 and 1914, by states, the number of establishments in the ice industry and in industries manufacturing ice as a subsidiary product with the total quantity and value of ice made by each class. The relative importance of the several states is but little affected by the addition of the ice reported by establishments in other industries. The total production of the seven leading states in 1919, each of which reported more than 1,000,000 tons for the year, aggregated 15,314,199 tons, or 54.8 per cent of the total output. The greatest absolute increase for the five-year period from 1914 to 1919, 970,061 tons, is shown by Illinois; the next largest, 924,517 tons, by New York; and Pennsylvania third largest with 584,055 tons.

**Number of establishments, by systems used.**—The distribution of the number of establishments by systems used in 1919 and 1914 is presented in Table 13. Of the establishments engaged primarily in the manufacture of ice for sale in 1919, 85 per cent used the compressor system solely, 12.2 per cent used the absorption, and 2.7 per cent used both systems. The compressor system predominated in every state in 1919, except Indiana and Kentucky, where 50 per cent and 50.5 per cent, respectively, of the establishments used the absorption system.

**Number of machines used, by system and capacity.**—In Table 14 is shown, for 1919, the number of machines by rated capacity (tons of refrigeration, ice making or ice equivalent) per day of 24 hours, by system used. The compressor system used 88.6 per cent of the anhydrous ammonia and the absorption system 94.6 per cent of all aqua ammonia reported.

## MANUFACTURES.

Quantity of ice manufactured, by kind of water used.—Table 15 shows for 1919, by states, the quantity and kind of ice produced from distilled and raw water. Of the total ice produced by establishments in the ice industry in 1919, 62.7 per cent were made from dis-

tilled water. The production of can ice largely predominates in all the states, only 1,209,214 tons, or 4.8 per cent of the total amount of ice produced, were made by the plate ice method.

TABLE 12.—MANUFACTURED ICE, QUANTITY AND VALUE, BY STATES: 1919 AND 1914.

STATE.	Census year.	NUMBER OF ESTABLISHMENTS MANUFACTURING ICE.			ICE MANUFACTURED.					
		Total.	In ice industry.	In other industries.	Total.		By establishments manufacturing ice.		By establishments in other industries.	
					Quantity (tons 2,000 lbs.).	Value.	Quantity (tons 2,000 lbs.).	Value.	Quantity (tons 2,000 lbs.).	Value.
United States.....	1919	3,455	2,887	588	27,948,463	\$138,795,342	25,292,846	\$126,284,510	2,655,617	\$12,510,892
	1914	3,077	2,543	534	21,043,063	62,192,413	18,324,691	55,258,327	2,718,372	6,934,066
Alabama.....	1919	71	59	12	422,113	2,244,269	370,511	1,968,210	42,572	276,059
	1914	64	55	9	362,774	1,307,818	307,856	1,148,893	54,918	168,925
Arizona.....	1919	34	31	3	161,683	1,249,408	158,848	1,211,618	2,815	37,790
	1914	29	27	2	126,008	746,473	(1)	(1)	(1)	(1)
Arkansas.....	1919	76	71	5	382,443	2,106,607	350,838	1,980,355	22,605	117,252
	1914	71	65	6	260,290	1,119,125	246,254	1,056,181	14,036	62,944
California.....	1919	136	117	19	1,551,703	5,832,421	1,492,981	5,520,410	58,722	312,011
	1914	116	95	21	1,047,941	2,801,304	1,021,559	2,633,426	20,382	167,878
Colorado.....	1919	34	27	7	230,199	1,093,891	205,671	974,430	24,528	119,461
	1914	34	32	2	177,570	608,434	(1)	(1)	(1)	(1)
Connecticut.....	1919	14	9	5	121,681	718,880	80,337	491,738	41,327	227,151
	1914	9	5	4	66,275	188,304	53,410	159,365	12,365	28,939
Delaware.....	1919	20	17	3	95,399	680,074	93,006	659,583	2,393	20,491
	1914	20	18	2	87,880	308,861	(1)	(1)	(1)	(1)
District of Columbia.....	1919	14	10	4	207,549	927,721	225,897	799,276	41,652	128,445
	1914	13	8	5	272,268	584,633	119,900	283,642	152,388	300,991
Florida.....	1919	102	95	7	695,316	4,129,174	653,918	3,865,492	41,398	263,682
	1914	98	92	6	481,188	2,241,031	449,675	2,102,276	31,488	138,755
Georgia.....	1919	74	70	4	762,189	4,248,183	742,747	4,184,969	19,442	63,214
	1914	77	74	3	575,595	1,946,568	583,280	1,916,117	12,315	30,451
Idaho.....	1919	21	15	6	45,308	277,036	39,948	233,343	5,358	43,693
	1914	16	10	6	20,307	119,747	16,594	98,460	3,713	21,287
Illinois.....	1919	190	154	36	2,430,812	10,675,692	2,194,093	9,735,215	236,719	940,477
	1914	165	128	37	1,480,751	3,059,844	1,288,358	8,289,012	176,893	370,832
Indiana.....	1919	126	107	19	915,408	4,004,065	828,773	3,720,104	88,635	373,871
	1914	130	106	24	734,353	2,089,023	643,622	1,378,178	90,781	209,845
Iowa.....	1919	63	46	17	324,844	1,907,033	289,910	1,680,358	34,934	226,675
	1914	44	34	10	214,232	651,341	188,928	552,076	25,304	99,265
Kansas.....	1919	157	137	20	656,735	3,822,696	583,202	3,292,601	98,583	531,095
	1914	118	101	17	596,831	1,912,082	487,763	1,666,156	108,068	245,876
Kentucky.....	1919	112	99	13	505,960	2,810,094	507,993	2,625,987	87,967	284,107
	1914	107	93	14	459,600	1,406,826	427,662	1,317,550	81,938	89,276
Louisiana.....	1919	77	70	7	770,982	3,839,473	751,525	3,713,911	19,437	125,562
	1914	79	76	3	598,680	1,911,018	590,033	1,870,672	7,747	31,346
Maryland.....	1919	76	61	15	646,494	2,741,496	611,908	2,502,398	34,586	149,098
	1914	68	62	6	552,978	1,494,246	535,737	1,451,238	17,241	43,008
Massachusetts.....	1919	15	12	3	177,566	894,111	155,268	745,098	22,298	149,013
	1914	8	6	2	80,528	191,402	(1)	(1)	(1)	(1)
Michigan.....	1919	25	18	7	477,530	3,040,957	422,120	2,788,882	55,416	257,075
	1914	16	11	5	229,901	846,471	178,236	744,353	51,665	101,118
Minnesota <sup>1</sup> .....	1919	8	5	3	126,513	365,315	118,341	333,078	8,172	32,237
Mississippi.....	1919	61	50	11	206,592	1,750,879	223,573	1,476,380	43,019	274,499
	1914	66	58	8	250,741	1,116,537	223,732	973,667	36,009	142,870
Missouri.....	1919	166	129	37	1,491,062	6,744,289	1,320,000	5,946,217	171,062	793,072
	1914	150	117	33	1,463,066	3,316,290	1,167,077	2,649,853	295,989	688,437
Montana <sup>2</sup> .....	1919	8	5	3	18,395	106,258	7,381	51,057	11,014	55,201
Nebraska.....	1919	51	33	18	274,415	1,391,894	180,453	890,139	92,962	501,755
	1914	29	18	11	193,424	568,550	117,464	818,050	75,960	250,500
New Jersey.....	1919	83	75	8	838,874	4,549,590	801,716	4,358,697	37,158	190,893
	1914	76	71	5	648,660	1,524,329	629,763	1,488,740	18,887	35,889
New Mexico.....	1919	16	13	3	80,399	496,357	75,157	448,598	5,242	47,759
	1914	18	15	3	55,385	243,513	(1)	(1)	(1)	(1)

<sup>1</sup> Combined to avoid disclosure of individual operations.<sup>2</sup> Figures for 1914 can not be shown without disclosing operations of individual establishments.

# MANUFACTURED ICE.

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TABLE 12.—MANUFACTURED ICE, QUANTITY AND VALUE, BY STATES: 1919 AND 1914—Continued.

STATE.	Census year.	NUMBER OF ESTABLISHMENTS MANUFACTURING ICE.			ICE MANUFACTURED.					
		Total.	In ice industry.	In other industries.	Total.		By establishments manufacturing ice.		By establishments in other industries.	
					Quantity (tons 2,000 lbs.).	Value.	Quantity (tons 2,000 lbs.).	Value.	Quantity (tons 2,000 lbs.).	Value.
New York.....	1919	152	132	20	3,484,522	\$13,863,030	3,214,659	\$12,731,812	269,863	\$1,131,218
	1914	141	111	30	2,560,005	5,408,204	2,143,681	4,649,480	416,324	758,724
North Carolina.....	1919	70	63	7	412,055	2,434,805	383,574	2,255,308	28,481	179,497
	1914	68	61	7	266,783	1,119,084	256,568	1,066,550	10,215	52,534
Ohio.....	1919	212	141	71	1,936,127	10,720,401	1,551,814	9,117,501	384,313	1,602,900
	1914	193	132	61	1,445,060	3,395,737	1,136,071	2,680,187	308,980	715,550
Oklahoma.....	1919	124	115	9	542,043	3,520,667	507,683	3,314,621	34,360	206,046
	1914	104	97	7	366,407	1,036,830	317,507	1,518,395	48,900	117,935
Oregon.....	1919	46	30	16	102,840	486,040	79,234	359,947	23,606	126,093
	1914	44	27	17	88,013	392,860	68,128	300,191	19,885	92,069
Pennsylvania.....	1919	205	226	69	2,715,576	12,698,211	2,513,490	11,812,878	202,086	885,333
	1914	250	189	67	2,131,521	5,310,716	1,959,742	4,934,429	171,779	385,287
Rhode Island <sup>1</sup> .....	1919	8	4	4	10,469	152,470	12,078	100,552	7,391	51,918
South Carolina.....	1919	58	54	4	299,783	2,037,147	202,275	1,096,884	7,508	40,263
	1914	39	36	3	188,227	842,630	177,758	807,736	10,469	34,903
Tennessee.....	1919	80	73	7	558,481	3,829,948	521,814	3,620,365	38,667	200,583
	1914	80	70	10	515,844	1,835,148	474,482	1,704,370	41,362	130,778
Texas.....	1919	201	265	26	1,704,397	9,651,555	1,537,828	8,810,334	166,560	832,221
	1914	291	255	30	1,388,864	5,805,783	1,149,074	4,981,332	239,790	824,401
Virginia.....	1919	115	106	9	649,544	3,477,990	636,111	3,302,452	13,433	85,538
	1914	95	87	8	481,236	1,663,432	446,047	1,557,065	35,189	106,367
Washington.....	1919	70	42	28	180,023	788,512	142,738	610,385	37,285	172,127
	1914	58	32	26	194,679	680,566	112,244	431,349	82,435	240,217
West Virginia.....	1919	68	54	14	324,846	1,549,528	271,155	1,341,448	53,691	208,080
	1914	61	47	14	250,235	792,300	203,757	661,040	51,478	131,200
All other states <sup>1</sup> .....	1919	36	27	9	190,506	840,166	144,248	603,789	46,348	242,377
	1914	26	22	4	135,005	397,944	626,320	2,358,298	26,045	135,329

<sup>1</sup> Figures for 1914 can not be shown without disclosing operations of individual establishments.

<sup>2</sup> All other states for 1919 embrace Maine, 2 establishments; Nevada, 5; North Dakota, 1; South Dakota, 4; Utah, 19; Wisconsin, 4; and Wyoming, 1. All other states for 1914 include Minnesota, 2 establishments; Montana, 2; Nevada, 5; Rhode Island, 2; South Dakota, 1; Utah, 11; Wisconsin, 2; and Wyoming, 1.

TABLE 13.—NUMBER OF ESTABLISHMENTS, BY SYSTEMS USED: 1919 AND 1914.

STATE.	TOTAL.		USING COMPRESSOR SYSTEM SOLELY.		USING ABSORPTION SYSTEM SOLELY.		USING BOTH SYSTEMS.		STATE.		TOTAL.		USING COMPRESSOR SYSTEM SOLELY.		USING ABSORPTION SYSTEM SOLELY.		USING BOTH SYSTEMS.	
			1919	1914	1919	1914	1919	1914			1919	1914	1919	1914	1919	1914	1919	1914
	1919	1914																
United States.....	12,807	2,543	2,438	2,077	351	417	77	49	Minnesota.....	5	2	5	2	6	1	1	1	1
Alabama.....	59	55	37	33	17	20	5	2	Mississippi.....	50	58	43	46	11	1	1	1	1
Arizona.....	31	27	31	26	1	1	—	—	Missouri.....	129	117	113	106	13	9	3	2	2
Arkansas.....	71	65	68	57	3	7	—	—	Montana.....	5	1	5	1	—	—	—	—	—
California.....	117	98	116	90	1	1	4	—	Nebraska.....	33	18	29	16	3	2	1	—	—
Colorado.....	27	32	25	29	2	3	—	—	New Jersey.....	75	71	65	60	6	11	4	—	—
Connecticut.....	9	5	9	5	—	—	—	—	New Mexico.....	13	15	11	13	1	2	1	—	—
Delaware.....	17	18	17	18	—	—	—	—	New York.....	132	111	121	100	9	11	2	—	—
District of Columbia.....	10	8	10	8	—	—	—	—	North Carolina.....	63	61	53	49	9	9	1	3	3
Florida.....	95	92	55	44	34	40	6	2	Ohio.....	141	132	111	104	21	24	9	4	4
Georgia.....	70	74	58	50	9	23	3	1	Oklahoma.....	115	97	108	91	5	5	2	1	1
Idaho.....	15	10	14	10	1	—	—	—	Oregon.....	30	27	30	27	—	—	—	—	—
Illinois.....	154	128	131	108	19	20	4	—	Pennsylvania.....	226	189	211	175	11	9	4	5	5
Indiana.....	1,107	108	44	46	53	53	9	7	Rhode Island.....	4	2	4	2	—	—	—	—	—
Iowa.....	46	34	42	31	2	2	2	1	South Carolina.....	54	36	46	28	7	4	1	4	4
Kansas.....	137	101	124	90	9	9	4	2	Tennessee.....	73	70	51	50	17	19	5	1	1
Kentucky.....	99	93	45	34	50	55	4	4	Texas.....	265	255	257	241	6	11	2	3	3
Louisiana.....	70	76	51	58	18	18	1	—	Utah.....	17	10	16	10	1	—	—	—	—
Maryland.....	61	62	58	58	2	4	1	—	Virginia.....	106	87	95	71	10	15	1	1	1
Massachusetts.....	12	6	10	5	2	1	—	—	Washington.....	42	32	41	31	1	1	—	—	—
Michigan.....	18	11	17	11	1	—	—	—	West Virginia.....	54	47	52	36	2	11	—	—	—
									All other states.....	7	6	6	6	1	—	—	—	—

<sup>1</sup> Includes 1 establishment using the vacuum system.

## MANUFACTURES.

TABLE 14.—NUMBER OF MACHINES USED, BY SYSTEM AND CAPACITY: 1919.

CAPACITY.	Total number of machines.	SYSTEM.		CAPACITY.	Total number of machines.	SYSTEM.	
		Com- pressor.	Absorp- tion.			Com- pressor.	Absorp- tion.
United States.....	4,523	3,902	561	20 but less than 30 tons.....	707	606	101
Less than 10 tons.....	523	477	46	30 but less than 50 tons.....	735	632	103
10 but less than 20 tons.....	807	684	123	50 but less than 100 tons.....	956	839	117
				100 tons or more.....	795	724	71

TABLE 15.—QUANTITY OF ICE MANUFACTURED, BY KIND OF WATER USED: 1919.

	QUANTITY (TONS 2,000 POUNDS).					QUANTITY (TONS 2,000 POUNDS).			
	Total.	Distilled water.		Raw water.		Total.	Distilled water.		Raw water.
		Can ice.	Plateice	Can ice.			Can ice.	Plateice	Can ice.
United States.....	25,292,846	15,703,906	144,660	8,379,726	1,064,554	Mississippi.....	223,573	206,363	17,210
Alabama.....	379,541	323,997	13,782	39,362	2,400	Missouri.....	1,320,000	1,069,341	248,750
Arizona.....	158,348	80,980	.....	77,888	.....	Montana.....	7,381	7,381	.....
Arkansas.....	359,838	274,870	5,424	79,535	.....	Nebraska.....	180,453	106,081	74,422
California.....	1,492,981	445,321	250	1,019,190	28,211	New Jersey.....	801,716	504,577	32,627
Colorado.....	205,671	202,246	2,745	680	.....	.....	.....	.....	50,200
Connecticut.....	80,337	51,960	.....	11,653	16,724	New Mexico.....	75,157	67,686	7,471
Delaware.....	93,006	5,998	950	26,816	59,442	New York.....	3,214,650	1,140,940	29,655
District of Columbia.....	225,397	60,122	4,000	15,593	146,182	North Carolina.....	383,574	347,477	36,097
Florida.....	653,918	575,697	7,358	57,363	13,500	Ohio.....	1,551,814	1,146,434	399,600
Georgia.....	742,747	626,304	2,475	77,068	36,900	Oklahoma.....	507,683	485,549	8,256
Idaho.....	39,948	1,568	.....	24,138	14,242	Oregon.....	79,234	2,133	73,376
Illinois.....	2,194,088	1,005,655	.....	1,188,438	.....	Pennsylvania.....	2,513,490	1,361,620	27,224
Indiana.....	828,778	730,910	219	97,644	.....	Rhode Island.....	12,078	6,001	3,128
Iowa.....	289,910	175,665	.....	100,760	13,485	South Carolina.....	292,275	178,990	113,285
Kansas.....	563,202	402,279	1,800	60,123	.....	South Dakota.....	5,795	2,700	3,095
Kentucky.....	507,993	460,226	.....	38,767	.....	Tennessee.....	521,814	481,555	4,280
Louisiana.....	751,525	701,941	.....	49,584	.....	Texas.....	1,537,828	1,230,207	23,379
Maryland.....	611,908	293,633	.....	138,400	178,975	Utah.....	80,949	80,637	12,600
Massachusetts.....	155,288	9,317	.....	118,258	26,693	.....	.....	.....	75
Michigan.....	422,120	32,578	.....	389,542	.....	Virginia.....	636,111	431,150	8,532
Minnesota.....	118,341	.....	.....	118,341	.....	Washington.....	142,788	35,853	86,902
						West Virginia.....	271,155	235,956	700
						All other states.....	48,504	22,451	28,053

## MANUFACTURED ICE.

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## GENERAL TABLES.

Comparative statistics, by states.—Table 16 gives, for 1919, 1914, and 1909, by states, the number of establishments, average number of wage earners, primary horsepower, wages, cost of materials, and value of products for the ice industry.

**Detailed statement, by states.**—Table 17 presents, for 1919, statistics in detail for the industry as a whole, and for each state that can be shown separately without the possibility of disclosing the operations of individual establishments.

TABLE 16.—COMPARATIVE SUMMARY, BY STATES: 1919, 1914, AND 1909.

## MANUFACTURES.

TABLE 17.—DETAILED STATEMENT,

STATE.	Number of establish- ments.	PERSONS ENGAGED IN THE INDUSTRY.								WAGE EARNERS DEC. 15, OR NEAREST REPRESENTATIVE DAY.						Capital.	
		Total.	Propri- etors and firm mem- bers.	Salari- ed offi- cers, super- in- tendents, and man- agers.	Clerks, etc.		Wage earners.				Total.	16 and over.		Under 16.			
					Male.	Female.	Aver- age num- ber.	Number, 15th day of—		Male.		Male.	Female.	Male.	Female.		
								Maximum month.	Minimum month.								
1	United States.....	2,887	38,605	1,566	3,873	1,874	1,045	30,247	Jy 41,078	Ja 20,796	31,101	30,654	258	187	2	Dollars. 270,725,786	
2	Alabama.....	59	713	41	76	26	17	553	Au 750	Fe 357	572	557	3	12		4,414,642	
3	Arizona.....	31	360	23	36	25	4	272	Jy 305	Ja 184	226	226				1,928,003	
4	Arkansas.....	71	688	56	76	18	13	525	Jy 835	Ja 297	508	507	1			3,787,120	
5	California.....	117	1,895	85	146	88	46	1,555	Jy 1,938	Ja 1,177	1,561	1,554	3	4		21,547,099	
6	Colorado.....	27	316	12	37	18	7	242	Au 403	Ja 156	284	284				2,500,478	
7	Connecticut.....	9	103	8	16	7	5	67	Au 95	Fe 38	61	58	3			837,756	
8	Delaware.....	17	165	10	16	1	7	131	Au 213	Ja 75	109	109				1,115,979	
9	District of Columbia.....	10	296	1	33	22	2	238	Au 263	De 210	244	242	2			4,120,741	
10	Florida.....	95	1,702	51	127	87	25	1,412	Se 1,549	Ja 1,312	1,527	1,490	26	2		12,614,312	
11	Georgia.....	70	1,412	31	122	124	20	1,115	Jy 1,320	Ja 905	1,163	1,152		10	1	8,393,956	
12	Idaho.....	15	84	11	10	4	3	56	Au 93	Ja 32	60	59	1			561,560	
13	Illinois.....	154	2,140	42	255	98	64	1,681	Au 2,303	Ja 1,084	1,592	1,572	20			17,897,626	
14	Indiana.....	107	1,188	60	184	42	47	855	Jy 1,321	Ja 488	821	803	12	6		6,869,598	
15	Iowa.....	46	661	35	65	32	25	504	Jy 717	De 313	336	333	3			4,620,885	
16	Kansas.....	137	1,098	113	105	25	33	822	Au 1,309	Ja 458	894	881	5	8		5,463,771	
17	Kentucky.....	99	961	35	118	31	23	754	Jy 1,140	Fe 420	741	736	3	2		6,206,468	
18	Louisiana.....	70	1,022	19	137	60	21	735	Jy 1,003	Fe 599	801	782	5	14		5,588,193	
19	Maryland.....	61	775	41	60	38	6	632	Au 839	Ja 428	783	781	2			5,609,036	
20	Massachusetts.....	12	182	4	15	9	1	163	Au 182	Ja 119	160	160				2,062,115	
21	Michigan.....	18	868	14	66	12	34	742	Jy 1,084	Ja 460	769	748		21		5,105,412	
22	Minnesota.....	5	122	—	15	7	7	93	Au 105	Ja 3	76	94	1			899,401	
23	Mississippi.....	50	557	29	57	17	7	447	Au 623	Ja 302	479	478	1			2,086,356	
24	Missouri.....	129	1,554	85	174	70	51	1,174	Au 1,642	Ja 762	1,351	1,326	24	1		13,914,580	
25	Montana.....	5	24	5	1	2	2	14	Je 18	Ja 3	10	14				74,419	
26	Nebraska.....	33	335	31	25	18	4	257	Au 407	De 140	191	190	1			1,348,145	
27	New Jersey.....	75	1,033	28	116	32	19	838	Au 1,123	Fe 572	961	933	3	25		6,335,620	
28	New Mexico.....	13	137	2	12	4	4	115	Au 178	Ja 57	132	131	1			621,056	
29	New York.....	132	2,558	37	220	104	50	2,138	Au 2,084	Ja 1,531	2,172	2,138	5	29		23,301,071	
30	North Carolina.....	63	922	25	100	26	14	757	Jy 1,031	Ja 503	687	678	2	12		3,257,859	
31	Ohio.....	141	2,644	85	215	87	205	1,952	Jy 2,959	Ja 3	1,148	2,176	2,143	33		16,990,167	
32	Oklahoma.....	115	1,185	84	167	66	37	831	Au 1,338	Ja 409	918	881	5	31	1	8,712,039	
33	Oregon.....	30	159	24	18	5	4	108	Jy 167	Ja 66	115	115				1,123,460	
34	Pennsylvania.....	226	3,468	118	291	238	88	2,733	Jy 3,673	Ja 1,903	2,876	2,837	30	9		27,850,486	
35	Rhode Island.....	4	27	3	2	—	2	20	Je 3	Ja 3	34	33	1			121,178	
36	South Carolina.....	54	727	23	80	32	8	584	Au 791	Ja 386	646	646				8,859,915	
37	South Dakota.....	3	11	2	1	—	—	8	Jy 3	Ja 3	4	4				80,904	
38	Tennessee.....	73	1,296	43	99	73	18	1,083	Au 1,551	Ja 691	1,003	1,051	5	7		5,999,180	
39	Texas.....	265	3,168	140	357	250	59	2,302	Au 3,305	Ja 1,527	2,252	2,239	4	9		20,265,185	
40	Utah.....	17	119	5	5	4	—	105	Se 177	Ja 48	80	80				1,060,741	
41	Virginia.....	106	1,227	58	127	49	24	989	Jy 1,459	Fe 641	983	958	21	4		8,132,158	
42	Washington.....	42	260	24	30	11	14	181	Au 235	Ja 142	195	193	1	1		1,674,797	
43	West Virginia.....	54	473	22	48	17	14	872	Jy 513	Ja 235	409	407	2			3,326,085	
44	All other states <sup>4</sup> .....	7	70	1	13	2	2	52			57	48	9			588,314	

<sup>1</sup> Includes water wheels and turbines (irrespective of ownership of water supply), and water motors (operated by water from city mains).<sup>2</sup> Chiefly electric motors operated by rented (or purchased) current; other power included (chiefly shaft-belt or transmitted power from neighboring power plants).

# MANUFACTURED ICE.

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INDUSTRY, BY STATES: 1919.

EXPENSES.										POWER.									
Salaries and wages.			Rent and taxes.			For materials.				Value of products.	Value added by manufacturer.	Primary horsepower.				Electric horsepower generated in establishments reporting.			
Officials.	Clerks, etc.	Wage earners.	For contract work.	Rent of factory.	Taxes, Federal, state, county, and local.	Principal materials.	Fuel and rent of power.	Total.	Steam engines (not turbines).	Steam turbines.	Internal-combustion engines.	Water power. <sup>1</sup>	Rent-ed. <sup>2</sup>						
Dollars. 8,108,243	Dollars. 2,842,888	Dollars. 34,001,837	Dollars. 234,167	Dollars. 771,325	Dollars. 4,940,061	Dollars. 17,271,245	Dollars. 25,606,264	Dollars. 137,004,798	Dollars. 94,127,289	Dollars. 572,970	Dollars. 393,312	Dollars. 13,630	Dollars. 28,003	Dollars. 2,542	Dollars. 135,483	Dollars. 26,114	Dollars. 1		
163,303	39,028	475,817	604	1,070	56,852	302,378	477,371	2,085,975	1,306,226	9,658	7,764	45	1,849	108	2				
87,814	26,848	371,838	5,238	5,973	46,015	204,608	347,630	1,410,148	979,910	4,537	2,781	20	539	1,177	3				
134,874	29,814	490,260	418	57,070	58,978	306,117	448,380	2,122,331	1,377,834	18,516	11,401	570	375	435	4				
370,238	158,515	1,955,056	5,763	41,966	269,748	846,972	1,354,723	7,112,470	4,910,775	32,113	9,039	475	1,784	20,660	5				
54,700	25,900	274,403	400	3,030	37,326	54,106	189,173	1,045,477	802,138	5,025	4,756	35	18	216	6				
36,655	14,702	90,988	-----	2,077	20,345	73,778	115,033	495,820	306,100	1,640	1,150	45	105	346	7				
31,200	6,370	193,847	421	-----	14,582	177,765	101,041	650,583	330,177	1,597	1,064	-----	143	25	8				
62,842	37,473	209,524	-----	7,800	54,777	180,429	237,589	1,080,666	662,048	6,258	1,954	1,475	391	2,438	9				
214,707	102,939	1,153,136	1,400	33,537	98,851	613,546	910,304	4,051,516	2,527,066	18,011	15,049	1,618	742	1,601	10				
251,083	163,300	1,059,690	2,498	5,723	138,257	671,600	907,493	2,440,220	2,861,136	14,249	12,670	125	27	1,427	11				
23,010	6,162	69,755	85	1,500	7,542	15,281	32,358	272,221	224,582	1,258	50	75	-----	1,133	12				
820,353	153,395	2,226,295	2,865	23,503	404,795	968,532	1,645,988	10,093,263	7,578,745	41,110	16,095	2,185	27	30	12				
307,030	84,963	868,498	14,501	9,657	118,709	608,170	745,125	4,059,300	2,676,095	12,075	10,268	145	62	1,600	14				
157,449	46,350	539,271	3,029	5,075	50,446	186,727	345,750	1,841,012	1,308,535	5,859	4,140	445	1,274	371	15				
200,887	46,364	937,039	450	4,875	121,461	416,531	702,497	3,500,107	2,390,079	16,500	13,400	50	1,162	185	16				
180,038	44,180	602,432	3,015	10,310	66,163	338,513	575,381	2,689,130	1,775,236	12,548	10,706	187	440	3	17				
231,494	73,401	783,099	9,523	2,330	170,906	538,073	784,574	3,990,334	2,667,087	14,730	12,120	160	320	2,080	18				
99,136	40,338	708,752	-----	3,277	71,770	402,305	574,454	2,717,377	1,740,618	11,693	9,757	40	1,645	70	19				
22,956	10,655	201,347	-----	9,820	49,694	30,906	152,086	745,098	502,100	3,995	3,540	108	176	150	21				
153,121	80,101	1,188,323	-----	-----	81,200	452,670	264,768	2,821,088	2,104,252	8,137	1,328	-----	-----	6,809	31				
25,740	11,115	90,634	-----	22,100	34,657	55,194	333,078	243,227	1,671	-----	100	-----	1,571	22					
80,631	25,609	371,546	100	2,030	61,042	219,950	348,935	1,515,223	940,388	6,298	5,759	150	-----	389	23				
351,527	92,038	1,426,044	7,010	36,840	242,273	684,972	1,428,021	6,504,840	4,399,847	29,116	24,488	785	529	3,316	24				
3,000	2,706	24,270	-----	1,556	1,113	3,061	18,465	50,662	39,536	264	20	-----	244	-----	25				
38,465	24,135	342,153	4,100	5,840	10,900	70,548	260,570	947,286	617,168	4,238	1,467	680	65	2,016	26				
248,141	48,955	1,032,520	5,870	2,300	190,270	440,000	903,241	4,550,965	3,207,724	14,454	12,145	790	670	90	27				
18,888	5,414	123,990	12,581	19,425	83,011	107,089	408,474	277,474	2,259	1,389	185	20	665	28					
673,572	183,748	2,999,561	50,399	256,714	541,810	1,288,892	2,588,800	13,308,590	9,430,888	54,531	26,040	634	2,510	25,338	29				
163,026	49,925	646,201	5,403	15,638	76,097	322,201	438,941	2,365,122	1,603,980	7,415	6,249	175	132	85	30				
516,857	237,438	2,617,976	3,800	14,007	272,901	1,394,055	1,504,008	10,208,061	7,310,000	34,030	20,474	795	841	6,820	31				
257,928	78,322	944,215	4,400	4,125	108,141	370,489	664,580	8,574,431	2,530,356	18,394	14,280	725	2,201	1,128	32				
45,922	12,126	157,943	555	15,450	22,438	20,927	83,731	556,002	451,344	115	2,440	195	2,130	33	34				
503,307	304,740	3,201,913	38,547	75,392	427,414	1,879,057	2,258,215	12,080,299	8,548,127	51,516	41,355	308	2,350	7,210	2,961				
1,600	470	23,888	300	7,304	1,115	17,411	14,673	100,552	68,498	419	190	225	4	774	253				
132,967	44,032	406,240	-----	3,004	43,107	312,099	399,909	2,012,380	1,299,712	8,954	6,846	687	376	1,066	36				
1,800	-----	12,027	-----	484	1,024	8,963	31,034	20,147	158	-----	12	-----	146	37					
104,783	98,067	887,257	1,247	4,077	109,393	537,912	615,746	3,774,291	2,620,633	11,087	10,650	20	24	80	38				
675,413	309,033	2,222,930	59,519	18,788	442,743	1,250,185	1,894,730	9,311,061	6,666,146	55,870	42,694	1,933	5,664	210	39				
7,600	3,400	124,280	240	604	12,184	65,584	395,855	306,520	2,152	1,480	153	-----	57	402	40				
243,817	72,883	975,037	8,906	54,502	101,183	458,512	739,560	3,964,030	2,766,558	18,670	14,875	414	997	275	41				
57,882	16,874	271,390	-----	9,031	37,270	70,496	109,342	819,665	639,827	4,818	724	-----	45	3,549	42				
80,365	27,075	410,867	375	350	53,933	242,319	238,922	1,514,801	1,031,560	8,100	6,344	295	450	988	43				
24,592	3,204	71,330	-----	500	4,099	17,749	60,758	222,652	144,145	806	690	103	-----	78	44				

<sup>1</sup> Same number reported for one or more other months.

<sup>2</sup> All other states embrace: Maine, 2 establishments; Nevada, 2; North Dakota, 1; Wisconsin, 1; and Wyoming, 1.

DEPARTMENT OF COMMERCE  
BUREAU OF THE CENSUS  
WASHINGTON

FOURTEENTH CENSUS OF THE UNITED STATES  
MANUFACTURES: 1919

IRON AND STEEL

BLAST FURNACES, FERROALLOYS, STEEL WORKS  
AND ROLLING MILLS, TIN PLATE AND  
TERNEPLATE, WIRE

Prepared under the supervision of EUGENE F. HARTLEY, Chief Statistician for Manufactures



WASHINGTON  
GOVERNMENT PRINTING OFFICE  
1923

## EXPLANATION OF TERMS.

**Scope of census.**—Census statistics of manufactures are compiled primarily for the purpose of showing the absolute and relative magnitude of the different branches of industry covered and their growth or decline. Incidentally, the effort is made to present data throwing light upon character of ownership, size of establishments, and similar subjects. When use is made of the statistics for these purposes it is imperative that due attention be given to their limitations, particularly in connection with any attempt to derive from them figures purporting to show average wages, cost of production, or profits.

The census did not cover establishments which were idle during the entire year or for which products were valued at less than \$500, or the manufacturing done in educational, eleemosynary, and penal institutions.

**Period covered.**—The returns relate to the calendar year 1919, or the business year which corresponded most nearly to that calendar year, and cover a year's operations, except for establishments which began or discontinued business during the year.

**The establishment.**—As a rule, the term "establishment" represents a single plant or factory, but in some cases it represents two or more plants which were operated under a common ownership or for which one set of books of account was kept. If, however, the plants constituting an establishment as thus defined were not all located within the same city, county, or state, separate reports were secured in order that the figures for each plant might be included in the statistics for the city, county, or state in which it was located. In some instances separate reports were secured for different industries carried on in the same establishment.

**Classification by industries.**—The establishments were assigned to the several classes of industries according to their products of chief value. The products reported for a given industry may thus, on the one hand, include minor products different from those covered by the class designation, and, on the other hand, may not represent the total product covered by this designation, because some products of this class may be made in establishments in which it is not the product of chief value.

**Influence of increased prices.**—In comparing figures for cost of materials, value of products, and value added by manufacture in 1919 with the corresponding figures for earlier censuses, account should be taken of the general increase in the prices of commodities during recent years. To the extent to which this factor has been influential the figures fail to afford an exact measure of the increase in the volume of business.

**Persons engaged in the industry.**—The following general classes of persons engaged in the manufacturing industries were distinguished: (1) Proprietors and firm members, (2) salaried officers of corporations, (3) superintendents and managers, (4) clerks (including other subordinate salaried employees), and (5) wage earners.

The number of persons engaged in each industry, segregated by sex, and, in the case of wage earners, also by age (whether under 16 or 16 and over), was reported for a single representative day. The 15th of December was selected as representing for most industries normal conditions of employment, but where this date did not portray such conditions, an earlier date was requested.

In the case of employees other than wage earners the number thus reported for the representative date has been treated as equivalent to the average for the year, since the number of employees of this class does not ordinarily vary much from month to month. In the case of wage earners the average has been obtained in the manner explained in the next paragraph.

In addition to the more detailed report by sex and age of the number of wage earners on the representative date, a report was obtained of the number employed on the 15th of each month, by sex, without distinction of age. From these figures the average number of wage earners for the year has been calculated by dividing the sum of the numbers reported for the several months by 12. The importance of the industry as an employer of labor is believed to be more accurately measured by this average than by the number employed at any one time or on a given day.

The number of wage earners reported for the representative day, though given in certain tables for each separate industry, is not totaled for all industries combined, because, in view of the variations of date, such a total is not believed to be significant. It would involve more or less duplication of persons working in different industries at different times, would not represent the total number employed in all industries at any one time, and would give an undue weight to seasonal industries as compared with industries in continual operation.

In order to determine as nearly as possible the age distribution of the average number of wage earners for an industry, the per cent distribution by age of the wage earners for December 15, or the nearest representative day, has been calculated from the actual numbers reported for that date. The percentages thus obtained have been applied to the average number of wage earners for the year to determine the average numbers 16 years and over, and under 16, employed.

**Salaries and wages.**—Under these heads are given the total payments during the year for salaries and wages, respectively. The Census Bureau has not undertaken to calculate the average annual earnings of either salaried employees or wage earners. Such averages would possess little real value, because they would be based on the earnings of employees of both sexes, of all ages, and of widely varying degrees of skill. Furthermore, so far as wage earners are concerned, it would be impossible to calcu-

late accurately even so simple an average as this, since the number of wage earners fluctuates from month to month in every industry, and in some cases to a very great extent. The Census Bureau's figures for wage earners, as already explained, are averages based on the number employed on the 15th of each month, and while representing the number according to the pay rolls to whom wages were paid on that date, no doubt represent a larger number than would be required to perform the work in any industry if all were continuously employed during the year.

**Prevailing hours of labor.**—No attempt was made to ascertain the number of wage earners working a given number of hours per week. The inquiry called merely for the prevailing practice followed in each establishment. Occasional variations in hours in an establishment from one part of the year to another were disregarded, and no attention was paid to the fact that a few wage earners might have hours differing from those of the majority. All the wage earners of each establishment are therefore counted in the class within which the establishment itself falls. In most establishments, however, practically all the wage earners work the same number of hours, so that the figures give a substantially correct representation of the hours of labor.

**Capital (amount actually invested).**—The instructions on the schedule for securing data relating to capital were as follows:

"The answer should show the total amount of capital, both owned and borrowed, on the last day of the business year reported. All the items of fixed and live capital may be taken at the amounts carried on the books. If land or buildings are rented, that fact should be stated and no value given. If a part of the land or buildings is owned, the remainder being rented, that fact should be so stated and only the value of the owned property given. Do not include securities and loans representing investments in other enterprises."

These instructions were identical with those employed at the censuses of 1914 and 1909. The data compiled in respect to capital, however, at both censuses, as well as at all preceding censuses of manufactures, have been so defective as to be of little value except as indicating general conditions. In fact, it has been repeatedly recommended by the census authorities that this inquiry be omitted from the schedule. While there are some establishments whose accounting systems are such that an accurate return for capital could be made, this is not true of the great majority, and the figures therefore do not show the actual amount of capital invested.

**Materials.**—The statistics as to cost of materials relate to the materials used during the year, which may be more or less than the materials purchased during the year. The term "materials" covers fuel, rent of power and heat, mill supplies, and containers, as well as materials which form a constituent part of the product.

**Rent and taxes.**—The taxes include certain Federal taxes and state, county, and local taxes. Under "Federal taxes" there are included the internal revenue tax on manufactures (tobacco, beverages, etc.), excise taxes when included in value reported for products, corporation capital stock tax, and corporation income tax, but not the income tax for individuals and partners.

**Value of products.**—The amounts given under this heading represent the selling value or price at the factory of all products manufactured during the year, which may differ from the value of the products sold.

**Value added by manufacture.**—The value of products is not always a satisfactory measure of either the absolute or the relative importance of a given industry, because only a part of this value is actually created by the manufacturing processes carried on in the industry itself. Another part, and often by far the larger one, represents the value of the materials used. For many purposes, therefore, the best measure of the importance of an industry, from a manufacturing standpoint, is the value created by the manufacturing operations carried on within the industry. This value is calculated by deducting the cost of the materials used from the value of the products. The figure thus obtained is termed in the census reports "value added by manufacture."

**Cost of manufacture and profits.**—The census data do not show the entire cost of manufacture, and consequently can not be used for the calculation of profits. No account has been taken of depreciation or interest, rent of offices and buildings other than factory or works, insurance, ordinary repairs, advertising, and other sundry expenses.

**Primary horsepower.**—This item represents the total primary power equipment of the manufacturing establishments plus the amount of power, principally electric, rented from other concerns. It does not cover the power of electric motors taking their current from dynamos driven by primary power machines operated by the same establishment, because the inclusion of such power would obviously result in duplication. The figures for primary horsepower represent the rated capacity of the engines, motors, etc., and not the amount of power in actual daily use.

**Fuel.**—Statistics of the quantity of fuel used are shown only for anthracite and bituminous coal, coke, fuel oils, gasoline and other volatile oils, and gas, and represent the quantity used during the year. As only the principal kinds of fuel are shown, comparison as to the total cost of all fuel is impracticable.

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# IRON AND STEEL.

## THE INDUSTRIAL GROUP.

**Relationship of the industries.**—Five classes of products—(1) pig iron, (2) ferroalloys, (3) steel, and hot rolled iron and steel, (4) tin plate and terneplate, and (5) wire—are to a large extent closely related. Most of the black-plate mills have tin-dipping departments and produce finished tin and terne plate, and some wire-rod mills turn out finished wire products.

At prior censuses separate reports were received for the tin-plate departments of black-plate rolling mills and the wire-drawing departments of wire-rod mills, but at the present census this segregation was abandoned, and reports for plants involving steel production, hot rolling, and tin dipping or wire drawing, or other fabricating operations for the production of finished products from rolled stock cover all operations of the plant, though some of the products when made in plants that did not produce the rolled stock are the subject of other industry classifications.

The comparability of the general statistics with prior censuses is therefore affected, especially with respect to the tin and terne plate industry and the wire industry, because some departments of rolling mills, formerly included in the classified tin-plate and terneplate or wire industry, because of segregated reports having been made therefor, now are included in the rolling-mill statistics.

The statistics for specific products, however, represent total production, irrespective of the industry classification of the producing plants.

The blast-furnace industry is preserved intact. Separate reports were made for the blast-furnace department of plants making pig iron, steel, and doing hot rolling in one industrial unit. More than 70 per cent of the pig-iron production goes into steel in the same plant. A transfer value was assigned to the pig iron which figures as product and income for the blast furnace and as raw material and expense for the steel department.

The manufacture of ferroalloys has been made a specific industry which carries as subgroups the blast-furnace ferroalloys and the electric-furnace products. At previous censuses the blast-furnace ferroalloys were included in the pig-iron industry. Of the total ferroalloy product, about 30 per cent was consumed in the producing plants. Statistics for the ferroalloy industry are given as a separate section of this report.

Less than 1 per cent of the output of tin and terne plate was manufactured by independent dipping plants not directly connected with black-plate mills.

The wire industry as here represented is not confined to iron and steel wire. It includes all establishments engaged primarily in wire drawing, but steel

wire is the leading product, and nearly two-thirds of the steel and iron wire is drawn in plants that roll the wire rods. The statistics for the wire industry are given in a special section of this report.

**Duplication within the iron and steel industry.**—The duplications arising from the use of the finished product of one establishment as raw material of another within the same group results in the totals being of but little significance. Within the steel-works and rolling-mills industry alone there is considerable duplication. Table 1 shows for 1919, 1914, and 1909 the gross value of products for the industrial group and its component industries, the value of the products consumed by establishments within the group, and the remaining balance, which balance represents production available for outside consumption and export. It also shows the average number of wage earners and the value added by manufacture, together with the per cent distribution of the several totals.

Of the total value of blast-furnace products in 1919, over four-fifths was used by the steel works and rolling mills; and of the aggregate value of products for the industrial group, 31.1 per cent was consumed by establishments within the group in 1919, 32.5 per cent in 1914, and 33.8 per cent in 1909.

**Blast furnaces and steel works and rolling mills.**—On account of interdepartmental duplications, but little significance can be attached to the combined cost of materials and value of products for the separate industries involved, but statistics of labor, power, and certain financial operations can be properly combined. Such statistics are presented in Table 2 for the blast-furnace and steel-work and rolling-mill industries combined, for the censuses 1899 to 1919, inclusive.

Pig-iron production in 1919 was an increase of 32.3 per cent over that of 1914, the latter being 9.3 per cent less than in 1909. The year 1914 was one of great depression in the iron and steel industry. The steel works and rolling mills consumed 72.9 per cent of the pig iron produced in 1899, 73.3 per cent in 1904, 74.4 per cent in 1909, 74.9 per cent in 1914, and 78.3 per cent in 1919.

**Principal states, ranked by value of products.**—Table 3 shows for blast furnaces and steel works and rolling mills combined, by states, ranked according to value of products, the average number of wage earners, value of products, and value added by manufacture, with per cent distribution. Certain states included with "All other states" ranked higher than some of those named in the table.

## MANUFACTURES.

TABLE 1.—IRON AND STEEL—DUPLICATIONS WITHIN THE INDUSTRIAL GROUP: 1919, 1914, AND 1909.

	Aggregate.	Blast furnaces.	Ferroalloys.	Steel works and rolling mills.	Wire mills (not departments of steel-rolling mills).	Tin-plate and terneplate mills (not departments of steel-plate mills).
Gross value of products:						
1919.....	\$3,921,508,874	\$704,466,558	\$38,583,084	\$2,828,902,376	\$162,151,236	\$97,404,720
1914.....	1,386,502,522	317,653,083	.....	918,664,565	81,842,012	68,342,962
1909.....	1,509,607,080	391,420,283	.....	985,722,534	84,486,518	47,966,645
Products consumed by establishments within this industrial group:						
1919.....	1,220,006,958	655,002,125	31,014,054	533,000,779	.....	.....
1914.....	449,993,647	248,630,958	.....	201,362,680	.....	.....
1909.....	510,538,170	297,471,122	.....	213,027,057	.....	.....
Products minus interindustry duplications:						
1919.....	2,701,501,916	139,464,433	6,669,930	2,295,811,597	162,151,236	97,404,720
1914.....	916,508,875	69,023,025	.....	717,301,876	81,841,012	68,342,962
1909.....	999,069,801	93,958,161	.....	772,655,477	84,486,518	47,966,645
Wage earners, average number:						
1919.....	441,955	41,660	2,344	375,088	19,741	3,122
1914.....	300,910	29,356	.....	248,716	17,600	5,238
1909.....	301,941	38,429	.....	240,076	18,084	5,352
Value added by manufacture:						
1919.....	1,415,311,804	173,180,062	10,485,408	1,148,326,618	59,337,645	23,982,071
1914.....	416,765,715	53,073,923	.....	327,838,873	25,416,518	10,436,401
1909.....	429,036,370	70,701,394	.....	328,221,678	28,943,587	6,080,211
Per cent distribution:						
Gross value of products—						
1919.....	100.0	20.3	1.0	72.1	4.1	2.5
1914.....	100.0	22.9	.....	66.3	5.9	4.9
1909.....	100.0	25.9	.....	65.3	5.6	3.2
Products minus interindustry duplications:						
1919.....	100.0	5.2	0.2	85.0	6.0	3.6
1914.....	100.0	7.4	.....	76.6	8.7	7.3
1909.....	100.0	9.4	.....	77.3	8.5	4.8
Wage earners, average number:						
1919.....	100.0	9.4	0.5	84.9	4.5	0.7
1914.....	100.0	9.8	.....	82.7	5.8	1.7
1909.....	100.0	12.7	.....	70.5	6.0	1.8
Value added by manufacture:						
1919.....	100.0	12.2	0.8	81.1	4.2	1.7
1914.....	100.0	12.7	.....	78.7	6.1	2.5
1909.....	100.0	16.5	.....	76.5	5.6	4.4

TABLE 2.—COMPARATIVE SUMMARY—BLAST FURNACES AND STEEL WORKS AND ROLLING MILLS COMBINED: 1919, 1914, 1909, 1904, AND 1899.

	1919	1914	1909	1904	1899	PER CENT OF INCREASE. <sup>1</sup>			
						1914—1919	1909—1914	1904—1909	1899—1904
Number of establishments.....	695	587	654	805	688	18.4	-10.2	8.1	-9.4
Persons engaged in the industry.....	468,817	307,356	303,823	259,201	231,871	52.5	1.2	17.2	11.8
Proprietors and firm members.....	70	87	95	90	170	.....	.....	.....	-47.1
Salaried employees.....	51,993	20,217	25,223	16,561	9,211	78.0	15.8	52.3	79.8
Wage earners (average number).....	416,748	278,072	278,505	242,640	222,490	49.9	-0.2	14.8	9.1
Primary horsepower.....	5,420,349	3,928,826	3,274,400	2,422,577	1,598,073	38.0	20.0	35.2	51.6
Capital.....	\$3,458,034,058	\$1,720,652,188	\$1,492,315,770	\$936,327,830	\$573,391,688	10.10	15.3	54.9	63.3
Salaries and wages.....	\$824,722,293	\$254,558,528	\$220,523,384	\$162,177,898	\$132,559,764	22.0	15.4	38.0	22.8
Salaries.....	\$113,315,468	\$43,030,504	\$32,716,076	\$20,761,392	\$11,737,488	100.0	33.4	57.7	76.8
Wages.....	\$711,408,825	\$210,923,024	\$187,807,288	\$141,426,506	\$120,820,276	237.0	12.3	32.8	17.1
Value added by manufacture <sup>2</sup> .....	\$1,321,506,680	\$380,912,796	\$399,013,072	\$285,641,383	\$281,570,341	247.0	-4.5	39.7	1.4
Pig iron:									
Production, tons (2,240 pounds).....	30,543,167	28,260,731	28,651,798	16,623,625	14,447,701	82.3	-9.3	54.3	15.1
Consumption by steel works and rolling mills, tons.....	23,921,071	17,429,657	19,076,889	12,191,228	10,410,281	37.2	-8.6	56.5	17.1
Finished rolled products and forgings, tons.....	25,512,847	18,482,182	19,276,237	12,769,993	10,398,768	38.0	-4.1	51.1	22.7

<sup>1</sup> A minus sign (—) denotes decrease; percentages are omitted where basis is less than 100.<sup>2</sup> Aggregate value of products less aggregate cost of materials.

TABLE 3.—BLAST FURNACES AND STEEL WORKS AND ROLLING MILLS COMBINED—PRINCIPAL STATES, RANKED BY VALUE OF PRODUCTS: 1919.

STATE.	Number of establishments.	WAGE EARNERS.			VALUE OF PRODUCTS.			VALUE ADDED BY MANUFACTURE.		
		Average number.	Per cent distribution.	Rank.	Amount (expressed in thousands).	Per cent distribution.	Rank.	Amount (expressed in thousands).	Per cent distribution.	Rank.
		1919	1914	1909	1919	1914	1909	1919	1914	1909
United States.....	695	416,748	100.0	.....	\$3,623,360	100.0	.....	\$1,321,507	100.0	.....
Pennsylvania.....	256	186,334	44.7	2	1,607,492	44.4	1	585,059	44.3	1
Ohio.....	128	82,818	19.9	2	805,604	22.2	2	286,857	21.7	2
Indiana.....	26	23,730	5.7	3	251,807	6.9	3	98,500	7.5	3
Illinois.....	37	22,306	5.4	4	238,107	6.6	4	86,261	6.5	4
New York.....	39	20,111	4.8	5	152,195	4.2	5	57,067	4.9	5
Alabama.....	30	13,335	3.2	7	121,998	3.4	6	27,793	2.1	6
West Virginia.....	24	12,047	2.0	8	91,448	2.5	7	35,143	2.6	7
New Jersey.....	19	14,298	3.4	6	78,241	2.1	8	41,166	3.1	6
Wisconsin.....	15	4,441	1.1	10	36,304	1.0	9	15,566	1.2	9
Kentucky.....	9	2,367	0.6	18	22,784	0.7	11	6,459	0.5	16
Michigan.....	18	2,550	0.6	16	21,878	0.6	12	8,678	0.7	12
California.....	3	3,476	0.8	13	18,192	0.5	14	8,683	0.7	11
Missouri.....	8	3,142	0.8	14	14,980	0.4	15	7,591	0.6	13
Delaware.....	6	1,009	0.2	22	7,115	0.2	18	3,253	0.2	20
All other states.....	72	24,778	5.9	.....	155,224	4.3	.....	53,341	4.0	.....

## BLAST FURNACES.

### GENERAL STATISTICS.

**Distribution of the industry.**—The blast-furnace ferroalloys are included for the present census in the ferroalloy section of this report, and the statistics here presented are confined to the pig-iron industry exclusive of ferroalloys.

The industry at prior censuses embraced all ferroblast-furnace products. Comparisons for 1919 with respect to prior censuses are therefore to a certain extent affected by this change in classification.

**Comparative summary.**—Table 4 summarizes the statistics for the pig-iron industry for each census from 1879 to 1919, showing percentages of increase for each census period.

**Principal states, ranked by value of products.**—Table 5 gives, by states, the average number of wage earners, value of products, and value added by manufacture, ranked according to value of products, with the per cent distribution of the several items.

**Persons engaged in the industry.**—Table 6 presents the comparative statistics for 1919, 1914, and 1909, for persons engaged in the industry, classified as to their occupational status, sex, and whether over or under 16 years of age. The age classification of the average number of wage earners is an estimate obtained by the method described in the "Explanation of terms."

**Wage earners, by months.**—In Table 7 are shown the statistics, by months, for wage earners for 1919, 1914, and 1909, and for 1919 by states. The table affords a view of the seasonal movements of the labor market in the industry and in a way the industrial conditions obtaining therein. Female wage earners are negligible, only a few being incidentally reported.

**Prevailing hours of labor.**—Table 8 illustrates the tendency towards shortening the hours of labor. In 1909, 96.5 per cent of the wage earners were in establishments where the prevailing hours of labor were over 60 per week, and none in establishments of 54 hours or less per week. In 1914 the proportion of those working in establishments where the prevailing hours of labor were over 60 per week fell to 79.1 per cent, and 5.6 per cent were in establishments with 54 hours per week or less; while in 1919, 7 per cent were in establishments with hours of 48 or less per week, and only 67 per cent in the over 60-hour class.

**Size of establishments, by average number of wage earners.**—The industry is one of large units, as shown by Table 9. In 1919 the establishments averaged 214

wage earners as compared with 183 in 1914 and 185 in 1909. In 1919 there were 51 establishments, or 26.1 per cent of the total number, that employed over 250 wage earners, the aggregate number constituting 64 per cent of all wage earners. In 1914, 33 establishments of this class reported 53.4 per cent of all wage earners, and in 1909, 45 establishments reported 55.3 per cent of all wage earners.

**Size of establishments, by value of products.**—The grouping by value of products in Table 10 necessarily reflects the general increase in values, which accounts in the main for changes from lower to higher groups. In 1909 the average value of products per establishment was approximately \$1,900,000, and in 1914, \$1,985,000; but in 1919 it was \$4,074,000. On a quantity production basis the establishments averaged approximately 123,000 tons of pig iron per establishment in 1909; 145,200 tons in 1914; and 155,200 tons in 1919. In 1909, 41.3 per cent of the establishments reported products of \$1,000,000 and over, with 85.8 per cent of the value of all products; and in 1914, 41.3 per cent of the establishments were of the same character, with 85.9 per cent of the value of all products. In 1919 this group carried 66.7 per cent of all establishments, 96.1 per cent of the value of all products, and produced 96.9 per cent of the pig-iron tonnage.

**Character of ownership.**—With a few exceptions the establishments are owned by corporations. Of the 195 establishments constituting the industry in 1919, 187 were corporations, the remaining 8 being equally divided between individuals and "all other," the latter chiefly firms, these reporting but approximately 1 per cent of the products.

**Number and horsepower of types of prime movers.**—Table 11 presents the power equipment statistics for 1919, 1914, and 1909. This table emphasizes the increase in electric power. Owned power increased during the period 1914-1919, 27.7 per cent; purchased electric power 123 per cent.

**Fuel consumed.**—Table 12 presents, by states, the comparative statistics of fuel consumed in the industry in 1919 and 1914 by kinds. The figures include the smelting fuels as well as those used for steam and power purposes. The table includes the statistics for charcoal used in the charcoal-iron furnaces.

## MANUFACTURES.

TABLE 4.—COMPARATIVE SUMMARY: 1919, 1914, 1909, 1904, 1899, 1889, AND 1879.

	1919	1914	1909	1904	1899	1889	1879	PER CENT OF INCREASE. <sup>1</sup>							
								1914-1919	1909-1914	1904-1909	1899-1904	1889-1899	1879-1889		
Number of establishments.....	195	160	208	190	223	304	341	21.9	-23.1	9.5	-14.8	-26.6	-10.9		
Persons engaged.....	46,956	33,194	43,061	37,335	41,046	(2)	(2)	41.5	-22.9	15.3	-0.0				
Proprietors and firm members.....	41	15	48	26	48	(2)	(2)								
Salaried employees.....	5,255	3,823	4,584	2,231	1,757	(2)	(2)	37.5	-16.6	105.5	27.0				
Wage earners (average number).....	41,660	29,356	38,420	35,078	39,241	33,415	41,605	41.0	-23.6	9.6	-10.6	17.4	(8)		
Primary horsepower.....	1,581,432	1,222,273	1,173,422	773,278	497,272	248,928	(2)	29.4	4.2	51.7	55.5	90.8			
Capital.....	\$802,416,541	\$102,281,594	\$487,580,659	\$236,145,529	\$143,159,232	\$120,517,428	\$80,531,302	73.6	-5.2	106.5	0.5	20.4	4.4		
Salaries and wages.....	\$87,204,443	\$28,895,203	\$31,131,142	\$21,825,410	\$20,788,520	\$16,226,145	\$12,655,428	302.0	-7.2	42.6	5.0	28.1	(4)		
Salaries.....	\$13,435,048	\$6,114,577	\$6,524,612	\$2,890,897	\$2,304,120	(3)	(2)	120.0	-6.3	125.7	25.5				
Wages.....	\$73,769,395	\$22,780,626	\$24,006,530	\$18,034,513	\$18,184,400	(2)	(2)	224.0	-7.4	30.0	2.4				
Paid for contract work.....	\$692,293	\$265,108	\$68,808	\$7,871	\$103,201	(2)	(2)	161.0	285.0	174.0	-92.4				
Rent and taxes.....	\$20,936,561	\$2,937,517	\$2,147,148	\$884,636	\$1,010,724	(2)	(2)	613.0	36.8		-2.0				
Cost of materials.....	\$621,286,496	\$264,580,000	\$320,637,880	\$178,941,918	\$131,503,655	\$110,098,615	\$58,010,742	135.0	-17.5	70.2	36.1	19.4	87.8		
Value of products.....	\$794,466,558	\$317,053,933	\$391,429,283	\$231,827,707	\$200,756,557	\$145,643,153	\$80,315,569	150.0	-18.8	68.8	12.1	42.0	63.1		
Value added by manufacture.....	\$173,180,062	\$53,073,923	\$70,791,394	\$52,880,789	\$75,252,902	\$35,544,533	\$30,695,827	226.0	-25.0	33.9	20.7	111.7	15.8		
Pig-iron production, tons (2,240 pounds).....	30,543,167	23,269,731	25,651,708	16,023,825	14,447,701	8,845,185	3,375,912	31.3	-9.3	54.3	15.1	63.3	162.0		

<sup>1</sup> A minus sign (—) denotes decrease; percentages are omitted where base is less than 100.<sup>2</sup> Exclusive of internal revenue.<sup>2</sup> Figures not available.<sup>3</sup> Figures not strictly comparable.<sup>4</sup> Value of products less cost of materials.

TABLE 5.—PRINCIPAL STATES, RANKED BY VALUE OF PRODUCTS: 1919.

STATE.	Number of establish- ments.	WAGE EARNERS.			PRODUCTS.			VALUE ADDED BY MANUFACTURE.		
		Average number,	Percent distribution.	Rank.	Total value.		Pig Iron (tons).	Amount (expressed in thousands).	Per cent distribution.	Rank.
					Amount (expressed in thousands).	Per cent distribution.				
United States.....	195	41,660	100.0	.....	\$794,467	100.0	.....	30,543,107	.....	.....
Pennsylvania.....	58	14,610	35.1	1	311,080	30.6	1	12,014,112	66,120	38.2
Ohio.....	42	9,793	23.5	2	179,284	22.4	2	7,073,337	41,547	24.0
Illinois.....	5	2,129	5.1	5	64,762	8.1	3	2,528,888	13,236	7.7
Alabama.....	21	5,214	12.5	3	57,018	7.1	4	2,111,381	12,147	7.0
New York.....	9	2,210	5.3	4	51,602	6.4	6	1,890,994	11,291	6.5
Michigan.....	11	1,101	2.7	7	13,534	1.7	7	420,301	3,235	1.9
Virginia.....	12	1,081	2.6	8	10,098	1.3	8	291,117	1,828	1.1
West Virginia.....	4	417	1.0	14	6,412	0.8	13	251,751	901	0.5
Tennessee.....	8	884	2.1	9	6,218	0.8	14	182,033	1,651	0.9
Kentucky.....	4	475	1.1	13	4,465	0.6	15	163,708	854	0.5
New Jersey.....	3	487	1.2	12	3,858	0.4	16	118,418	1,111	0.6
All other states.....	18	3,250	7.8	.....	86,186	10.8	.....	3,497,127	10,259	11.1

TABLE 6.—PERSONS ENGAGED IN THE INDUSTRY: 1919, 1914, AND 1909.

CLASS.	Cen- sus year.	Total.	Male.	Fe- male.	PER CENT OF TOTAL.		CLASS.	Cen- sus year.	Total.	Male.	Fe- male.	PER CENT OF TOTAL.						
					Male.	Fe- male.						Male.	Fe- male.					
All classes.....	1919	46,956	46,005	951	98.0	2.0	Clerks and other subordinate salaried employees.....	1919	3,914	3,031	883	77.2	22.8					
	1914	33,194	32,813	381	98.9	1.1		1914	3,070	2,698	372	87.9	12.1					
	1909	43,061	42,715	346	99.2	0.8		1909	3,513	3,182	331	90.6	9.4					
Proprietors and officials.....	1919	1,382	1,368	14	99.0	1.0	Wage earners (average number).....	1919	41,600	41,600	54	99.9	0.1					
	1914	768	765	3	99.6	0.4		1914	29,356	29,350	6	100.0	(1)					
	1909	1,110	1,112	7	99.4	0.6		1909	38,429	38,421	8	100.0	(1)					
Proprietors and firm members.....	1919	41	29	12	70.7	29.3	16 years of age and over.....	1919	41,656	41,602	54	99.9	0.1					
	1914	15	12	3	80.0	20.0		1914	29,304	29,298	6	100.0	(1)					
	1909	48	43	5	89.6	10.4		1909	38,301	38,353	8	100.0	(1)					
Salaried officers of corporations....	1919	222	221	1	99.5	0.5	Under 16 years of age.....	1919	4	4								
	1914	103	103	.....	100.0	.....		1914	52	52								
	1909	262	260	2	99.2	0.8		1909	68	68								
Superintendents and managers....	1919	1,110	1,118	1	99.9	0.1												
	1914	500	500	.....	100.0	.....												
	1909	800	809	.....	100.0	.....												

1 Less than one-tenth of 1 per cent.

# BLAST FURNACES.

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TABLE 7.—WAGE EARNERS, BY MONTHS AND BY STATES: 1919.

[The month of maximum employment is indicated by bold-faced figures and that of minimum employment by *italic* figures.]

STATE.	Average number employed during year.	NUMBER EMPLOYED ON 15TH DAY OF THE MONTH OR NEAREST REPRESENTATIVE DAY.												Per cent minimum is of maximum.
		January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	
United States:														
1919.....	41,660	51,407	47,415	44,830	40,399	37,939	37,533	40,412	42,394	42,897	33,628	39,022	41,975	65.3
Males.....	41,606	51,409	47,357	44,779	40,342	37,886	37,481	40,350	42,342	42,845	33,576	38,971	41,925	65.3
Females.....	54	58	58	60	57	53	52	53	52	52	52	51	50	83.3
1914.....	29,336	31,898	31,869	32,813	32,851	31,733	30,752	29,921	29,000	27,757	26,407	23,929	22,912	71.0
1909.....	38,420	34,755	31,369	31,156	33,458	34,537	36,537	37,429	38,182	41,998	43,841	45,092	46,727	71.6
Alabama.....	5,214	6,435	5,781	5,583	4,995	4,009	4,245	4,989	5,363	5,580	5,389	5,185	5,014	62.3
Illinois.....	2,129	2,571	2,382	2,172	2,006	1,806	1,840	2,075	2,276	2,304	2,219	2,478	2,419	47.4
Kentucky.....	475	697	472	529	328	213	168	552	555	559	556	496	575	24.1
Michigan.....	1,101	1,173	1,151	1,132	1,105	1,116	1,093	1,123	1,124	1,035	1,036	1,033	1,071	88.1
New Jersey.....	487	763	690	688	410	408	383	457	454	447	352	393	393	46.1
New York.....	2,210	2,558	2,273	2,275	2,181	2,301	2,221	2,467	2,345	2,318	1,589	1,966	2,026	62.1
Ohio.....	9,793	12,137	11,086	10,247	9,534	9,322	9,465	9,935	10,163	10,440	6,105	8,881	10,201	50.3
Pennsylvania.....	14,619	17,554	16,624	15,984	14,048	13,098	13,134	13,838	14,630	15,005	12,780	13,764	14,962	72.8
Tennessee.....	884	1,236	1,130	925	830	807	805	759	798	803	854	767	894	61.4
Virginia.....	1,081	1,748	1,604	1,508	1,309	1,100	687	775	807	831	867	869	861	39.3
West Virginia.....	417	484	362	318	303	253	262	266	690	708	380	426	572	35.6

TABLE 8.—AVERAGE NUMBER OF WAGE EARNERS, BY PREVAILING HOURS OF LABOR PER WEEK: 1919 AND 1914.

STATE.	Census year.	Total.	IN ESTABLISHMENTS WHERE THE PREVAILING HOURS OF LABOR PER WEEK WERE—						STATE.	Census year.	Total.	IN ESTABLISHMENTS WHERE THE PREVAILING HOURS OF LABOR PER WEEK WERE—							
			44 and under.	Between 44 and 48.	Between 48 and 54.	Between 54 and 60.	Over 60.	44 and under.				Between 44 and 48.	Between 48 and 54.	Between 54 and 60.	Over 60.				
			44	and	be-	be-	be-	44				and	be-	be-	over				
United States:	1919	41,000	1,471	(2)	1,453	30	2,617	8,153	27,936	New York.....	1919	2,210	(2)	124	—	154	1,932		
1914	29,356		11	80	1,551	13	4,474	23,227	37,090	1914	1,832	(2)	358	—	382	1,092			
1909	38,420		—	—	190	149	—	—	—	Ohio.....	1919	9,793	—	—	87	—	988	1,702	
Alabama.....	1910	5,214	—	—	302	—	—	2,445	2,467	1914	5,780	—	—	—	—	—	4,868		
1914	3,547		—	—	—	—	—	1,544	2,003	Pennsylvania.....	1919	14,610	1,034	(2)	1,273	—	856	1,961	
1910	—	—	—	—	—	—	—	—	—	1914	11,518	(2)	—	5	—	10,768			
Illinois.....	1919	2,129	272	—	263	—	—	—	1,594	Tennessee.....	1919	884	—	—	209	—	343	327	
1914	1,450		—	—	—	—	—	—	768	1914	503	—	—	—	135	—	368		
Kentucky <sup>2</sup> .....	1910	475	—	—	—	30	—	—	446	Virginia.....	1910	1,081	—	—	—	—	—	1,081	
1914	991		—	—	335	—	—	214	552	1914	689	—	—	—	—	—	689		
New Jersey <sup>4</sup> .....	1910	487	—	—	133	—	—	251	103	West Virginia <sup>2</sup> .....	1919	417	105	—	—	—	—	—	252

<sup>1</sup> Includes 48 and under for 1914 and 1909.

<sup>2</sup> Figures not available for 1914.

TABLE 9.—SIZE OF ESTABLISHMENTS, BY AVERAGE NUMBER OF WAGE EARNERS, FOR STATES: 1919.

STATE.	Establishments.	Wage earners (average number).	ESTABLISHMENTS EMPLOYING—												Over 1,000 wage earners.					
			1 to 5 wage earners, inclusive.			6 to 20 wage earners, inclusive.			21 to 50 wage earners, inclusive.			51 to 100 wage earners, inclusive.			101 to 250 wage earners, inclusive.			251 to 500 wage earners, inclusive.		
			Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.
United States:																				
1919.....	195	41,000	1	4	12	12	15	544	45	3,424	71	10,902	31	10,313	17	11,842	3	4,479		
1914.....	160	29,356	3	3	11	143	12	465	40	3,034	61	10,016	20	6,266	12	8,157	1	1,203		
1909.....	208	38,420	2	7	9	118	26	988	52	4,094	74	11,958	31	10,496	13	9,241	1	1,527		
Alabama.....	21	5,214	—	—	—	2	45	6	391	9	1,351	3	1,098	2	870	1	981	1	1,348	
Illinois.....	5	2,129	—	—	—	1	30	—	—	3	446	—	—	—	—	—	—	—	—	—
Kentucky.....	4	475	—	—	—	2	72	5	370	3	318	1	335	—	—	—	—	—	—	—
Michigan.....	11	1,101	—	—	—	1	10	—	—	5	400	1	348	—	—	—	—	—	—	—
New Jersey.....	3	487	—	—	—	1	12	4	191	2	307	3	405	—	—	—	—	—	—	—
New York.....	9	2,210	—	—	—	19	3	102	10	714	16	2,708	6	2,126	6	4,124	—	—	—	—
Ohio.....	42	6,793	—	—	—	5	66	1	26	13	1,017	23	3,069	6	1,917	7	4,780	2	3,131	
Pennsylvania.....	58	14,019	1	4	5	10	—	—	5	400	1	126	1	348	—	—	—	—	—	—
Tennessee.....	8	884	—	—	—	9	4	—	4	307	2	308	1	206	—	—	—	—	—	—
Virginia.....	12	1,081	—	—	—	1	12	—	—	3	405	—	—	—	—	—	—	—	—	—
West Virginia.....	4	417	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

## MANUFACTURES.

TABLE 10.—SIZE OF ESTABLISHMENTS, BY VALUE OF PRODUCTS: 1919, 1914, AND 1909.

VALUE OF PRODUCT.	NUMBER OF ESTABLISHMENTS.			AVERAGE NUMBER OF WAGE EARNERS.			VALUE OF PRODUCTS.			PIG IRON, TONS.		
				1919	1914	1909	1919	1914	1909	1919	1914	1909
	1919	1914	1909	1919	1914	1909	1919	1914	1909	1919	1914	1909
All classes.....	195	160	208	41,660	29,356	38,429	\$794,466,558	\$317,653,983	\$391,429,283	30,277,291	23,269,731	25,651,798
Less than \$100,000.....	10	12	14	131	138	287	631,780	562,742	700,718	15,908	22,098	31,123
\$100,000 to \$500,000.....	23	44	108	1,012	8,054	10,207	7,077,009	14,139,158	54,735,742	206,346	3,349,367	3,536,186
\$500,000 to \$1,000,000.....	32	38	2,648	23,164	27,935	763,590,444	30,052,790	335,992,523	704,411	19,397,666	22,084,489	
\$1,000,000 and over.....	130	66	86	37,869	21,164	27,935	272,899,283	335,992,523	29,350,626	29,350,626	19,397,666	22,084,489
PER CENT DISTRIBUTION.												
All classes.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Less than \$100,000.....	5.1	7.5	6.7	0.3	0.5	0.7	0.1	0.2	0.2	0.1	0.1	0.1
\$100,000 to \$500,000.....	11.8	27.5	{ 51.9	2.4	27.4	26.6	0.9	4.5	14.0	0.7	2.3	14.4
\$500,000 to \$1,000,000.....	16.4	23.7	{ 0.4	27.4	26.6	2.9	9.4	14.0	125,230	17.9	15.9	13.8
\$1,000,000 and over.....	68.7	41.3	41.3	99.9	72.1	72.7	98.1	85.8	85.5	90.9	85.5	80.1

TABLE 11.—NUMBER AND HORSEPOWER OF TYPES OF PRIME MOVERS: 1919, 1914, AND 1909.

POWER.	NUMBER OF ENGINES OR MOTORS.			HORSEPOWER.			Per cent distribution.		
				Amount.					
	1919	1914	1909	1919	1914	1909	1919	1914	1909
Primary power, total.....	3,451	2,345	3,093	1,581,432	1,222,273	1,173,422	100.0	100.0	100.0
Owned.....	2,447	1,874	2,640	1,533,203	1,200,672	1,158,572	97.0	98.2	98.7
Steam.....	2,300	1,734	2,508	1,249,817	1,005,374	1,033,033	79.0	82.2	88.0
Engines.....	2,057	(1)	(1)	997,501	(1)	(1)	63.1	63.1	63.1
Turbines.....	243	(1)	(1)	252,316	(1)	(1)	15.9	15.9	15.9
Internal-combustion engines.....	137	104	60	283,015	194,037	125,230	17.9	15.9	10.7
Water wheels, turbines and motors.....	10	36	12	371	1,261	309	(2)	0.1	(2)
Rented.....	1,004	471	453	48,229	21,601	14,850	3.0	1.8	1.3
Electric.....	1,004	471	453	48,204	21,601	14,850	3.0	1.8	1.3
Other.....			25				(2)		
Electric.....	7,450	5,072	3,462	242,554	212,582	135,143	100.0	100.0	100.0
Rented.....	1,004	471	453	48,204	21,601	14,850	19.9	10.2	11.0
Generated by establishments reporting.....	6,446	4,601	3,009	104,350	100,981	120,203	80.1	89.8	89.0

<sup>1</sup> Not reported separately.<sup>2</sup> Less than one-tenth of 1 per cent.

TABLE 12.—FUEL CONSUMED, BY STATES: 1919 AND 1914.

STATE.	Census year.	COAL.		Coke (tons, 2,000 pounds).	Charcoal (bushels).	Fuel oils (barrels).	Gasoline and other volatile oils (barrels).	Gas (1,000 cubic feet).
		Anthracite (tons, 2,240 pounds).	Bituminous (tons, 2,000 pounds).					
United States.....	1919	42,779	2,261,315	32,424,025	31,931,134	45,082	6,242	1,184,953
	1914	47,060	1,892,357	26,335,234	20,083,978	80,474	(1)	242,218
Alabama.....	1919		338,188	3,258,325	3,242,527			18,120
	1914		98,197	2,508,150	3,552,097			25,353
Illinois.....	1919		48,798	2,658,635			77	
	1914		58,723	1,041,514				
Indiana.....	1919		18,345	2,419,706				
	1914		35,512	215,752				70,918
Michigan.....	1919		500	24,060	21,382,919		25	
	1914			14,701	18,816,032	3	(1)	
Missouri.....	1919		16,234	28,290	4,603,973	31,406		
	1914		5,029	150,220				
New Jersey.....	1919		215					
	1914							
New York.....	1919		54,050	2,363,017		5,858	33	66,441
	1914		1,341	1,718,352				
Ohio.....	1919		650,212	7,743,804		1,266	8,056	72,842
	1914		195,862	5,736,226	344,000	9,588	(1)	11,775
Pennsylvania.....	1919	42,084	965,252	10,863,369	189,010	2,688	128	249,909
	1914	45,369	919,391	11,187,627	498,970	75	(1)	178,780
Tennessee.....	1919		25,508	322,357				
	1914		19,808	235,700	323,221			
Virginia.....	1919		30,831	480,601				
	1914		33,122	478,026	700,006			
West Virginia.....	1919		10,604	277,977				75,647
	1914		7,836	289,930	1,549,515	396		617,736
Wisconsin.....	1919							
	1914							
All other states.....	1919		29,956	1,107,199	873,190	3,301		4,331
	1914		350	437,455	2,309,375	4,848,652	70,808	(1)

<sup>1</sup> Included in figures for fuel oils.

## SPECIAL STATISTICS.

**Principal materials.**—Table 13 presents the statistics for the principal materials used in the industry for the census years 1919, 1914, 1909, and 1904.

The total cost in 1919, \$626,675,640, was distributed as follows: Ore, 49.1 per cent; scrap, etc., 3.7; fluxes, 4.1; fuel for smelting, 36.6; and other materials, 6.5. Corresponding percentages for 1914 and 1909, for ore, scrap, etc., combined, were 59.5 and 60.1, respectively, with consequent lower percentage for other materials. The total consumption of iron material in 1919, 59,302,848 tons, comprised 94.2 per cent of ore of all kinds and 5.7 per cent scrap, mill cinder, etc. The percentage of mill cinders, scrap, etc., in 1914 was 4.8 and in 1909, 3.9. The consumption of foreign ore was 69.5 per cent less in 1919 than in 1914.

TABLE 13.—MATERIALS: 1919, 1914, 1909, AND 1904.

	1919	1914	1909	1904
Total cost.....	\$626,675,640	\$264,580,000	\$320,637,839	\$178,941,018
Iron ore:				
Tons.....	55,865,997	43,320,817	48,353,677	30,032,902
Cost.....	\$307,714,137	\$150,855,740	\$187,284,001	\$100,045,360
Domestic—				
Tons.....	55,325,415	41,556,642	40,005,930	29,202,944
Cost.....	\$303,350,013	\$141,270,713	\$177,589,789	\$90,200,246
Foreign—				
Tons.....	540,582	1,770,175	1,747,747	820,918
Cost.....	\$1,358,124	\$0,670,027	\$0,674,812	\$1,739,123
Crude iron ore—				
Domestic—				
Tons.....	53,096,285			
Cost.....	\$203,037,171			
Foreign—				
Tons.....	370,794	(*)	(*)	(*)
Cost.....	\$3,040,227			
Calcinated, roasted, or treated ore—				
Domestic—				
Tons.....	981,330			
Cost.....	\$5,989,872			
Foreign—				
Tons.....	163,085	(*)	(*)	(*)
Cost.....	\$1,273,144			
Manganiferous ore (domestic)—				
Tons.....	364,771	(*)	(*)	(*)
Cost.....	\$2,220,409			
Pyrte cinder—				
Domestic—				
Tons.....	283,023			
Cost.....	\$1,508,471			
Foreign—				
Tons.....	5,803	(*)	(*)	(*)
Cost.....	\$43,753			
Scrap:				
Tons.....	1,067,808			
Cost.....	\$10,564,160			
Mill cinder, scale, slag, etc.:				
Tons.....	2,378,943	\$0,651,055	\$5,544,860	\$3,830,901
Cost.....	\$0,700,638			
Fluxes:				
Tons (2,000 pounds).....	15,590,004	11,490,685	13,670,845	8,325,209
Cost.....	\$25,722,638	\$11,184,378	\$12,230,403	\$6,888,647
Fuel for smelting.....	\$220,201,344	\$85,436,530	\$105,094,112	
Coke—				
Tons (2,000 pounds).....	34,605,700	26,883,082	31,436,530	19,739,671
Cost.....	\$228,260,007	\$83,400,448	\$102,134,423	\$67,126,997
Charcoal—				
Bushels.....	31,931,134	20,083,978	38,032,618	37,273,500
Cost.....	\$5,684,243	\$1,683,075	\$2,787,026	\$2,521,987
Anthracite—				
Tons.....	25,153	38,874	205,401	
Cost.....	\$104,280	\$155,377	\$904,102	
Bituminous coal—				
Tons (2,000 pounds).....	23,568	60,337	115,173	\$3,239,305
Cost.....	\$72,214	\$95,030	\$188,501	
Cost of fuel for generating power and rent of power.....	\$6,422,300	\$3,150,002	\$2,542,809	
All other materials, cost.....	\$34,341,805	\$7,302,295	\$7,052,015	\$4,388,752

<sup>1</sup> Includes \$5,389,144 materials reported by establishments engaged principally in the manufacture of ferroalloys, but producing some pig iron.

<sup>2</sup> Included above, not reported separately.

**Production of pig iron, by states.**—Comparative statistics for the production of pig iron, by states, are given in Table 14 for 1919, 1914, and 1909. At each census Pennsylvania, Ohio, and Illinois have occupied the first three ranking positions. Indiana advanced from sixth place in 1914 to fourth place in 1919. Pennsylvania produced 40 per cent of the total production in 1919, a slightly smaller proportion than at the two preceding censuses, while nearly four-fifths of the total was reported from the district comprising Ohio, Pennsylvania, Illinois, and Indiana. Alabama and New York ranked next in order and were the only other states producing more than 1,000,000 tons during the year. The table also shows the number of furnaces in active establishments, and in this respect Alabama and New York follow Ohio, outranking Illinois and Indiana.

TABLE 14.—PIG-IRON PRODUCTION, BY STATES: 1919, 1914, AND 1909.

STATE.	Number of furnaces. <sup>1</sup>	Tons.	Per cent of total.	Rank of state.	Value.
United States:					
1919.....	411	30,543,167	100.0		\$785,960,412
1914.....	2,353	23,260,731	100.0		312,761,617
1909.....	388	25,651,798	100.0		387,830,443
Pennsylvania:					
1919.....	149	12,014,112	39.3	1	314,253,542
1914.....	137	9,743,855	41.9	1	134,465,078
1909.....	145	10,911,676	42.5	1	107,588,407
Ohio:					
1919.....	77	7,073,337	23.2	2	176,592,690
1914.....	61	5,279,045	22.8	2	71,686,701
1909.....	67	5,446,971	21.2	2	82,048,712
Illinois:					
1919.....	24	2,528,888	8.3	3	61,734,028
1914.....	24	1,843,333	7.0	3	25,380,308
1909.....	23	2,468,772	9.6	3	38,299,897
Indiana:					
1919.....	16	2,292,562	7.5	4	51,591,467
Alabama:					
1919.....	42	2,111,381	6.9	5	54,771,825
1914.....	36	1,835,676	7.9	4	19,909,045
1909.....	40	1,764,544	6.9	4	21,221,707
New York:					
1919.....	25	1,890,994	6.2	8	60,212,451
1914.....	21	1,408,455	6.0	5	18,175,036
1909.....	18	1,717,991	6.7	5	26,596,413
Michigan:					
1919.....	12	420,301	1.4	7	13,512,066
1914.....	13	361,076	1.6	7	4,931,811
1909.....	12	327,644	1.3	9	5,094,504
Virginia:					
1919.....	13	291,117	1.0	9	9,232,864
1914.....	11	263,977	1.3	8	3,753,082
1909.....	17	387,328	1.5	7	5,324,997
Wisconsin:					
1919.....	5	277,597	0.9	11	7,829,928
1914.....	7	269,650	1.2	9	3,712,223
1909.....	6	285,454	1.1	13	4,691,351
West Virginia:					
1919.....	5	251,751	0.8	12	8,308,480
Tennessee:					
1919.....	10	182,033	0.6	14	6,150,705
1914.....	6	158,751	0.7	12	2,244,015
1909.....	15	333,416	1.3	8	4,644,667
Kentucky:					
1919.....	7	163,708	0.5	15	4,384,076
New Jersey:					
1919.....	5	118,418	0.4	16	3,850,353
Missouri:					
1919.....	3	69,051	0.2	17	2,433,059
All other states:					
1919.....	18	857,917	2.8		23,105,178
1914.....	2,37	2,078,913	8.9		28,524,320
1909.....	45	2,008,902	7.8		31,810,728

<sup>1</sup> Number of completed furnaces at end of year in active establishments.

<sup>2</sup> Includes 1 electric-charcoal furnace in California.

**Production of pig iron, by smelting fuels.**—Table 15 classifies the pig iron production, according to smelting fuels, for 1919, 1914, and 1909. Coke iron constituted

## MANUFACTURES.

98.5 per cent of the total tonnage in 1919, 97.5 per cent in 1914, and 95.6 per cent in 1909, leaving but 1.5 per cent, 2.5 per cent, and 4.4 per cent, respectively, for all other fuels. Charcoal iron shows a slight proportionate decrease, namely, from 1.4 per cent of the total production in 1909 to 1.2 per cent in 1914 and to 0.9 per cent in 1919. The average value per ton for all grades of iron in 1919 was an increase of 91.3 per cent over the average unit value in 1914.

TABLE 15.—PIG-IRON PRODUCTION, BY SMELTING FUELS: 1919, 1914, AND 1909.

PRODUCT.	1919	1914	1909
Total value.....	\$801,062,345	\$317,653,983	\$391,429,283
Pig iron:			
Tons (2,240 lbs.).....	30,543,167	23,209,731	25,651,798
Value.....	\$785,960,412	\$312,761,617	\$387,830,443
Unit value, ton.....	\$25.73	\$13.44	\$15.12
Classified according to smelting fuel.			
Coke—			
Tons.....	30,097,220	22,787,890	24,522,152
Value.....	\$770,101,169	\$304,356,130	\$368,131,822
Unit value, ton.....	\$25.50	\$13.36	\$15.01
Anthracite, and anthracite and coke mixed—			
Tons.....	94,465	87,910	670,901
Value.....	\$2,975,470	\$1,250,603	\$10,902,150
Unit value, ton.....	\$31.50	\$14.29	\$16.34
Bituminous coal and coke mixed—			
Tons.....	35,745	218,632	86,420
Value.....	\$1,385,663	\$2,704,134	\$1,552,814
Unit value, ton.....	\$38.77	\$22.79	\$17.97
Charcoal—			
Tons.....	315,737	275,290	372,235
Value.....	\$11,498,110	\$4,444,090	\$7,183,657
Unit value, ton.....	\$36.42	\$16.15	\$19.30
All other products, value.....	\$15,101,933	\$4,892,366	\$3,508,840

<sup>1</sup> Includes 5 establishments engaged primarily in the manufacture of ferroalloys, but producing some pig iron. At prior censuses the industry included the blast-furnace ferroalloys.

<sup>2</sup> Includes a considerable quantity of ferrromanganese pig iron.

<sup>3</sup> Includes a small quantity made with electricity and charcoal.

**Charcoal iron.**—In the early years of the industry charcoal was the chief smelting fuel and in 1859 nearly as much charcoal iron was produced as from all other fuels combined. Since that date the proportion has decreased until in 1919 it constituted less than 1 per cent of the total. Table 16 presents comparative statistics for the charcoal-iron branch of the industry for the census years 1919, 1914, 1909, and 1904.

Each census shows a decrease in the number of establishments and wage earners, and the production

decreased until 1919, when there was an increase of 14.7 per cent compared with 1914, the output, however, still not being up to the production of 1909 and prior years.

TABLE 16.—CHARCOAL IRON: 1919, 1914, 1909, AND 1904.

	1919	1914	1909	1904
Number of establishments.....	19	25	26	32
Salaried employees and wage earners.....	1,604	1,613	1,663	2,405
Salaried employees.....	164	143	157	200
Wage earners (average number).....	1,440	1,470	1,506	2,205
Capital.....	\$18,234,580	\$13,296,228	\$13,134,329	\$9,778,981
Salaries and wages.....	\$2,135,998	\$1,208,740	\$1,178,012	\$1,223,984
Salaries.....	\$388,991	\$259,426	\$261,091	\$260,350
Wages.....	\$1,707,007	\$949,314	\$917,521	\$943,034
Materials.....	\$9,152,805	\$3,715,978	\$5,609,250	\$5,056,194
Value of products.....	\$11,587,060	\$5,237,008	\$7,815,275	\$7,388,745
Pig iron—				
Tons (2,240 pounds).....	315,737	275,290	372,235	\$409,502
Value.....	\$11,498,110	\$4,444,090	\$7,183,657	\$6,993,085
All other products.....	\$88,956	\$792,318	\$331,018	\$305,663
Value added by manufacture <sup>1</sup> .....	\$2,434,261	\$1,521,030	\$2,200,025	\$2,332,554
Principal materials:				
Iron ore—				
Tons.....	610,206	542,458	755,075	\$89,438
Cost.....	\$3,215,503	\$1,508,343	\$2,401,381	\$2,032,596
Mill cinder—				
Tons (2,240 pounds).....	4,780			
Cost.....	\$35,011	940	94	549
Scrap—				
Tons (2,240 pounds).....	1,729	\$14,957	\$203	\$2,045
Cost.....	\$20,043			
Fluxes—				
Tons (2,000 pounds).....	35,714	48,306	64,678	68,884
Cost.....	\$69,498	\$53,380	\$67,311	\$67,089
Charcoal—				
Bushels.....	31,931,134	29,083,978	38,032,618	\$9,756,724
Cost.....	\$5,684,243	\$1,683,075	\$2,787,026	\$2,094,189

<sup>1</sup> Not including a blast furnace operated by a penal institution.

<sup>2</sup> Includes 1 electric, charcoal furnace.

<sup>3</sup> Value of products less cost of materials.

<sup>4</sup> Includes 2,486,700 bushels of charcoal, the stumpage and labor cost of which was reported under "Wages" and "Material" expense.

**Pig iron produced for consumption.**—Production for consumption was reported by 89 establishments in 1919. Table 17 presents the comparative statistics for the census years 1919, 1914, 1909, and 1904 bearing upon this subject. In 1919, 71 per cent of the pig iron produced was consumed in the works where produced, the corresponding percentages for 1914, 1909 and 1904 being 66.6, 61.8, and 59.7. A similar proportionate increase in the number of plants producing for consumption may also be noted. Of the amount available for sale, 31 per cent was purchased by steel works and rolling mills.

TABLE 17.—PIG-IRON PRODUCTION FOR CONSUMPTION: 1919, 1914, 1909, AND 1904.

	1919	1914	1909	1904	PER CENT OF TOTAL.				PER CENT OF INCREASE. <sup>1</sup>		
					1919	1914	1909	1904	1914-1919	1909-1914	1904-1909
Number of establishments.....	200	160	208	190	100.0	100.0	100.0	100.0	.....	.....	.....
Producing for consumption (or consumption and sale).....	89	64	57	52	44.5	40.0	27.4	27.4	.....	.....	.....
Producing for sale only.....	111	96	151	138	55.5	60.0	72.0	72.0	.....	.....	.....
Pig-iron production, tons (2,240 pounds).....	30,543,167	23,209,731	25,651,798	16,028,025	100.0	100.0	100.0	100.0	31.3	-9.3	54.3
For consumption in works of company producing. Consumed by steel works and rolling mills during year.....	21,687,378	18,495,004	15,858,203	9,926,545	71.0	66.6	61.8	59.7	40.0	-2.3	59.8
Balance for foundries, etc.....	517,240	275,308	605,467	(4)	69.3	65.4	59.5	.....	39.1	-0.2	.....
For sale.....	8,855,791	7,774,727	9,793,595	6,697,080	29.0	33.4	38.2	40.3	87.9	-54.5	46.2
Purchased by steel works and rolling mills during year.....	2,750,035	2,209,961	3,824,153	2,264,083	9.0	9.5	14.0	13.6	24.5	-42.2	89.9
Balance for foundries, export, etc.....	6,104,856	5,564,766	5,969,442	4,432,397	10.0	23.9	28.3	26.7	9.7	-6.8	34.7

<sup>1</sup> A minus sign (−) denotes decrease.

<sup>2</sup> Figures not available.

# BLAST FURNACES.

13

**Production of pig iron, by grades.**—Table 18 shows for the census years 1909 to 1919 the production of pig iron, classified by grades, together with the per cent of total represented by each grade and the per cent of increase for each census period.

The proportion of pig iron for steel making—basic,

Bessemer, and low-phosphorus grades—has steadily increased from 70.7 per cent of the total in 1909 to 74.6 per cent in 1914, and 79.4 per cent in 1919. A considerable increase in production over 1914 is found in each grade except low phosphorus and forge or mill.

TABLE 18.—PIG-IRON PRODUCTION, BY GRADES: 1919, 1914, 1909, AND 1904.  
[Ton, 2,240 pounds.]

GRADE.	1919	1914	1909	1904	PER CENT OF TOTAL.				PER CENT OF INCREASE. <sup>1</sup>		
					1919	1914	1909	1904	1914-1919	1909-1914	1904-1909
Total.....	30,543,167	23,260,731	25,651,798	16,623,625	100.0	100.0	100.0	100.0	31.3	-9.3	54.3
Basic.....	14,507,535	9,465,853	7,741,759	2,553,940	47.8	40.7	30.2	15.4	54.2	22.3	203.1
Bessemer.....	9,374,950	7,577,792	10,147,052	8,894,584	30.7	32.6	39.5	53.5	23.7	-25.3	14.1
Low phosphorus (below 0.4 per cent).....	289,726	305,738	248,720	102,795	0.9	1.3	1.0	1.2	-5.2	22.9	29.0
Foundry.....	4,792,961	4,325,100	5,539,410	3,675,310	15.7	18.6	21.6	22.1	10.8	-21.9	50.7
Malleable.....	1,090,314	730,910	934,211	316,984	3.6	3.1	3.6	1.9	49.2	-21.8	194.7
Forge or mill.....	287,520	488,172	580,685	601,677	0.9	2.1	2.3	3.6	-41.1	-16.8	-2.5
White, mottled, and miscellaneous.....	56,418	32,202	110,810	98,627	0.2	0.1	0.4	0.6	75.2	-70.9	12.4
Castings made direct from blast furnaces.....	53,704	14,384	16,181	9,469	0.2	0.1	0.1	0.1	273.3	-11.1	70.9
Ferroalloys.....	(2)	329,580	320,970	280,259	.....	1.4	1.3	1.6	.....	0.8	16.7

<sup>1</sup> A minus sign (—) denotes decrease.

<sup>2</sup> Included in report on "Ferroalloys."

**Production, by method of delivery or casting.**—The production of pig iron, classified according to the method of delivery or casting for 1919, 1914, and 1909, with number of establishments and per cent of total for each class, is shown in Table 19, together with statistics for Pennsylvania and Ohio, the principal pig-iron states.

TABLE 19.—PRODUCTION, BY METHOD OF DELIVERY OR CASTING: 1919, 1914, AND 1909.

METHOD AND STATE.	NUMBER OF ESTABLISHMENTS.	PRODUCTION, TONS.			PER CENT OF TOTAL.		
		1919	1914	1909	1919	1914	1909
					1919	1914	1909
United States.....	200	160	208	30,543,167	23,260,731	25,651,798	100.0 100.0 100.0
Delivered molten.....	60	44	38	18,138,453	11,936,791	12,197,686	50.4 51.3 47.6
Machine cast.....	86	56	49	7,746,636	6,007,417	6,096,707	25.3 25.8 19.9
Sand cast.....	117	111	172	3,970,409	4,081,867	7,055,508	13.0 20.1 20.8
Chill cast.....	23	19	19	634,045	420,272	685,506	2.1 2.7 2.7
Castings made direct from furnace.....	36	32	15	53,704	14,384	16,181	0.2 0.1 0.1
Pennsylvania.....	63	52	60	12,014,112	9,743,855	10,911,076	100.0 100.0 100.0
Delivered molten.....	23	10	18	8,020,694	5,712,780	5,887,507	66.8 58.6 54.0
Machine cast.....	36	24	23	3,071,311	2,690,520	2,837,576	25.6 27.7 28.0
Sand cast.....	30	38	60	727,101	1,112,180	1,007,514	6.1 11.4 17.5
Chill cast.....	11	6	7	173,415	217,750	274,516	1.4 2.2 2.5
Castings made direct from furnace.....	14	14	5	15,601	4,013	4,563	0.1 (1) (1)
Ohio.....	42	33	40	7,073,337	5,270,045	5,446,971	100.0 100.0 100.0
Delivered molten.....	17	11	9	4,036,452	2,797,254	2,723,700	57.0 53.0 50.0
Machine cast.....	24	16	12	2,078,216	1,035,242	949,036	29.4 31.0 17.3
Sand cast.....	17	21	33	877,157	630,630	1,020,073	9.6 12.0 20.8
Chill cast.....	5	5	3	274,172	206,012	152,824	3.9 3.9 2.8
Castings made direct from furnace.....	8	5	1	7,340	3,898	338	0.1 0.1 (1)
All other states.....	95	75	102	11,485,718	8,246,831	9,293,151	100.0 100.0 100.0
Delivered molten.....	19	14	11	6,075,307	3,426,751	3,586,479	53.0 41.5 38.6
Machine cast.....	26	16	14	2,597,120	1,675,655	1,314,185	22.7 20.3 14.1
Sand cast.....	70	57	89	2,506,051	2,933,048	4,122,081	22.4 35.6 44.4
Chill cast.....	7	8	9	186,458	205,504	258,226	1.6 2.5 2.8
Castings made direct from furnace.....	14	13	9	30,773	5,873	11,280	0.3 0.1 0.1

<sup>1</sup> Less than one-tenth of 1 per cent.

**Furnaces, number and capacity.**—Table 20 gives the number and daily capacity rating of the com-

pleted blast furnaces in active establishments at the end of the respective census years 1919, 1914, and 1909, by states and by smelting fuels. The average daily furnace capacity has increased from 261 tons in 1909 to 311 tons in 1914, and to 337 tons in 1919. The ratio of the pig-iron production for the year to the total rated daily capacity was 221 in 1919 as compared with 213 in 1914 and 253 in 1909.

TABLE 20.—BLAST FURNACES—ACTIVE ESTABLISHMENTS: 1919, 1914, AND 1909.

STATE AND KIND OF FUEL.	NUMBER.	DAILY CAPACITY—TONS (2,240 POUNDS).		
		1919	1914	1909
United States.....	411	352	388	138,347
Coke.....	382	315	332	136,334
Bituminous coal and coke.....	3	240	210	107,348
Autharacite and coke.....	5	8	25	438
Charcoal.....	21	29	31	1,336
Alabama.....	42	36	40	10,060
Coke.....	39	33	37	8,860
Charcoal.....	3	3	3	210
Colorado—coke.....	5	6	6	1,705
Connecticut—charcoal.....	2	3	3	48
Georgia.....	2	2	2	130
Coke.....	1	1	1	70
Charcoal.....	1	1	1	60
Illinois—coke.....	24	24	23	11,675
Indiana—coke.....	16	10	7	4,500
Kentucky.....	7	3	6	1,150
Coke.....	7	3	5	470
Charcoal.....	1	1	1	700
Maryland.....	5	5	5	1,615
Coke.....	4	4	4	1,600
Charcoal.....	1	1	1	15
Massachusetts—charcoal.....	1	2	2	15
Michigan.....	12	13	12	1,530
Coke.....	3	3	2	755
Charcoal.....	9	10	10	800
Minnesota—coke.....	3	1	1	1,100
Missouri.....	3	1	2	335
Coke.....	1	1	1	60
Charcoal.....	2	1	1	150
New Jersey.....	5	2	6	1,200
Coke.....	5	2	5	357
Anthracite and coke.....	1	1	1	1,290

TABLE 20.—BLAST FURNACES—ACTIVE ESTABLISHMENTS: 1919, 1914, AND 1909—Continued.

STATE AND KIND OF FUEL.	NUMBER.			DAILY CAPACITY—TONS (2,240 POUNDS).		
	1919	1914	1909	1919	1914	1909
New York—coke.....	25	21	18	9,176	7,135	6,508
Ohio.....	77	61	67	28,918	21,524	21,017
Coke.....	74	57	66	28,678	21,190	21,008
Bituminous coal and coke.....	3	3	—	240	325	—
Charcoal.....	—	1	1	—	9	9
Pennsylvania.....	149	137	135	55,557	46,934	41,707
Coke.....	142	124	117	55,109	45,896	39,294
Bituminous coal and coke.....	—	1	—	438	400	—
Anthracite and coke.....	5	8	24	—	617	2,395
Charcoal.....	2	4	4	—	10	18
Tennessee.....	10	6	15	1,139	620	1,560
Coke.....	10	5	13	1,139	605	1,545
Charcoal and coke.....	—	1	2	—	15	24
Texas—coke.....	1	—	1	100	—	70
Virginia.....	13	11	17	1,830	1,486	1,982
Coke.....	13	10	16	1,830	1,466	1,970
Charcoal.....	—	1	1	—	20	12
Washington—coke.....	1	—	—	65	—	—
West Virginia—coke.....	5	3	4	1,699	899	1,125
Wisconsin.....	5	7	6	1,158	1,310	1,060
Coke.....	4	5	5	1,028	1,180	935
Charcoal.....	1	2	1	130	130	125

**Number and capacity of completed furnaces.**—The number and rated capacity of all completed blast furnaces in all establishments, both active and idle, on December 31, 1919, are given, by states, in Table 21, classified according to mineral fuels and charcoal fuel. The former, designated as "coke," includes a few furnaces using anthracite and mixed coke and coal fuels.

The tonnage production of pig iron for the year was approximately 60 per cent of the total annual capacity of all furnaces as compared with 50 per cent in 1914.

TABLE 21.—BLAST FURNACES—NUMBER AND CAPACITY OF COMPLETED FURNACES, ALL ESTABLISHMENTS (ACTIVE AND IDLE), DECEMBER 31, 1919.

STATE.	NUMBER.			ANNUAL CAPACITY—TONS (2,240 POUNDS).		
	Total.	Coke. <sup>1</sup>	Charcoal.			
				Total.	Coke. <sup>1</sup>	Charcoal.
<b>COMPLETED FURNACES.</b>						
United States:						
1919.....	453	421	32	50,222,400	49,628,000	504,400
1914.....	451	409	42	44,405,000	43,736,700	648,300
Alabama.....	44	41	3	3,685,925	3,633,925	52,000
Colorado.....	6	6	—	925,000	825,000	—
Connecticut.....	2	—	2	12,000	—	12,000
Georgia.....	4	2	2	—	96,000	32,000
Illinois.....	25	25	—	4,089,850	4,085,850	—
Indiana.....	16	16	—	2,871,200	2,871,200	—
Kentucky.....	7	7	—	425,000	425,000	—
Maryland.....	5	4	1	480,000	484,000	4,000
Massachusetts.....	1	—	1	5,000	—	5,000
Michigan.....	12	3	9	554,500	265,000	289,500
Minnesota.....	3	3	—	401,750	401,750	—
Mississippi.....	1	—	1	3,500	—	3,500
Missouri.....	3	1	2	119,000	63,000	56,000
New Jersey.....	4	4	—	407,000	407,000	—
New York.....	27	26	1	3,351,700	3,346,700	5,000
Ohio.....	79	79	—	10,644,525	10,644,525	—
Oregon.....	1	—	1	15,000	15,000	—
Pennsylvania.....	165	160	5	19,739,850	19,727,450	12,400
Tennessee.....	16	14	2	622,300	581,300	41,000
Texas.....	1	—	—	36,000	36,000	—
Virginia.....	18	17	1	894,000	889,000	25,000
West Virginia.....	5	5	—	587,500	587,500	—
Wisconsin.....	8	6	2	523,800	466,800	57,000

<sup>1</sup> Including anthracite and mixed coke and coal.

**Blast furnaces, by capacity groups.**—Table 22 gives, by states, for 1919 and 1914 the number of blast fur-

naces in active establishments, classified by size groups as to daily capacity, together with the aggregate daily capacity of each group.

The capacity of nearly every group shows a material increase, the greatest both actual and relative, appearing in the group "500 tons and over."

TABLE 22.—BLAST FURNACES, BY CAPACITY GROUPS: 1919 AND 1914.

STATE.	Cen-sus year.	Total.	DAILY CAPACITY—TONS OF PIG IRON (2,240 POUNDS).					
			Less than 100 tons.	100 to 199 tons.	200 to 299 tons.	300 to 399 tons.	400 to 499 tons.	500 tons and over.
United States: Daily capacity.....	1919	138,347	2,013	8,994	15,297	19,744	34,334	57,965
	1914	106,411	1,697	7,067	13,208	19,208	34,808	32,523
Number of furnaces.....	1919	411	33	65	62	50	78	114
	1914	352	36	56	57	50	79	65
Alabama.....	1910	42	4	11	13	13	1	—
	1914	36	4	8	13	11	—	—
Colorado.....	1919	5	—	—	1	4	—	—
	1914	6	—	—	2	4	—	—
Illinois.....	1919	24	—	—	1	2	4	17
	1914	24	—	—	2	5	10	7
Indiana.....	1919	18	—	—	—	—	10	16
	1914	10	—	—	—	—	—	—
Kentucky.....	1919	7	2	2	3	—	—	—
	1914	3	2	2	1	—	—	—
Maryland.....	1910	5	1	—	—	—	4	—
	1914	5	1	—	—	—	3	1
Michigan.....	1919	12	7	3	—	2	—	—
	1914	13	7	4	—	2	—	—
Minnesota.....	1919	3	—	—	1	—	2	—
	1914	1	—	—	1	—	—	—
Missouri.....	1919	3	1	2	—	—	—	—
	1914	1	1	—	—	—	—	—
New Jersey.....	1919	5	—	—	1	—	2	—
	1914	2	—	—	1	—	—	—
New York.....	1919	25	—	—	6	9	—	9
	1914	21	—	—	1	6	8	5
Ohio.....	1919	77	2	7	11	11	29	17
	1914	61	1	9	7	12	20	12
Pennsylvania.....	1919	140	6	18	21	15	35	54
	1914	137	10	21	17	15	34	40
Tennessee.....	1919	10	5	3	2	—	—	—
	1914	6	3	1	2	—	—	—
Virginia.....	1919	13	1	11	1	—	—	—
	1914	11	8	6	2	—	—	—
West Virginia.....	1919	5	—	—	1	1	1	1
	1914	3	—	—	2	—	—	—
Wisconsin.....	1919	5	—	—	3	—	2	—
	1914	7	1	3	1	2	—	—
All other states <sup>1</sup> .....	1919	5	4	1	—	—	—	—
	1914	5	5	—	—	—	—	—

<sup>1</sup> Connecticut, Massachusetts, Texas, and Washington.

**Duration of runs.**—Comparative statistics for 1919 and 1914 are given in Table 23 for furnaces grouped according to size, measured by height of stacks, and according to duration of runs.

In 1919 the average run was 896 days as compared with 837 days in 1914. Including furnaces engaged in the production of ferroalloys, the 1919 average duration was 874 days, this being the figure comparable with that of 1914, when all furnaces are considered.

## BLAST FURNACES.

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TABLE 23.—BLAST FURNACES, GROUPED BY SIZE AND DURATION OF RUNS: 1919 AND 1914.

DURATION OF RUN.	TOTAL, <sup>1</sup>		GROUPED ACCORDING TO HEIGHT.									
	1919	1914	Less than 60 feet.		60 to 69 feet.		70 to 79 feet.		80 to 89 feet.		90 feet and over.	
			1919	1914	1919	1914	1919	1914	1919	1914	1919	1914
Number of furnaces reporting runs.....	306	287	5	7	20	27	65	61	122	103	94	89
Number of runs (last 3, when reported) <sup>2</sup> .....	594	664	12	10	37	59	128	152	225	234	192	203
Average length, days.....	874	837	333	415	786	728	697	738	862	782	1,057	1,041
Furnaces classified according to time group:												
Less than 500 days—												
Number of runs.....	185	201	11	11	17	23	59	51	59	77	39	36
Average length, days.....	205	300	314	216	255	255	286	310	320	306	285	325
500 to 1,000 days—												
Number of runs.....	180	240	1	4	9	22	36	67	90	95	53	72
Average length, days.....	744	728	540	627	746	704	750	709	725	738	776	748
1,000 to 1,500 days—												
Number of runs.....	131	123			5	0	23	17	48	41	55	56
Average length, days.....	1,207	1,215			1,104	1,227	1,175	1,230	1,207	1,197	1,224	1,222
1,500 to 2,000 days—												
Number of runs.....	69	52		1	3	3	9	0	23	15	34	24
Average length, days.....	1,072	1,712		1,704	1,798	1,750	1,717	1,690	1,611	1,601	1,601	1,726
2,000 to 2,500 days—												
Number of runs.....	15	19			3	1		3	3	4	9	11
Average length, days.....	2,252	2,206			2,274	2,025		2,124	2,237	2,214	2,250	2,242
2,500 days and over—												
Number of runs.....	5	9					1	2	2	2	2	4
Average length, days.....	3,202	2,882					3,284	2,750	2,700	3,747	2,981	2,879

<sup>1</sup> Includes 15 iron blast furnaces running on ferroalloys (1 "less than 60 feet"; 8, "70 to 79 feet"; and 6, "80 to 89 feet").<sup>2</sup> In some cases only 1 or 2 completed runs.

The record for the maximum furnace production for a day, a week, and a month, as reported at the census of 1909, stands unbroken, viz., the production of 918 tons of pig iron by the Edgar Thompson furnace "K," March 30, 1905; 5,315 tons by the Duquesne furnace No. 1 for a week in March, 1906; and 21,272 tons by the Edgar Thompson furnace "K" in March, 1905. The maximum production for a day since 1914 was made by furnace No. 6 of the Illinois Steel Co., November 20, 1919, 822 tons; for a week by same furnace in August, 1919, 5,063 tons; and for a month by furnace "A" of the Youngstown Sheet & Tube Co., March, 1918, 19,664 tons.

The record for both the longest run and the maximum output on a single lining is held by the Ensley furnace No. 3 of the Tennessee Coal, Iron & Railroad Co., which terminated February 29, 1920, a run of 3,845 days with a production of 1,429,707 gross tons of pig iron, and this without being once banked. The average daily output was 371.8 tons. Prior thereto the record for longest run on a single lining was held by the Schoenberger furnace No. 2, 3,431 days, terminating in August, 1906, banked 11 times, and 69 days lost in banking; and for maximum production on a single

lining by one of the Eliza furnaces of the Jones & Laughlin Steel Co., 1,353,625 tons on a run of 3,172 days terminating January 4, 1913, with one banking and a loss of 26 days, and an average daily output of 427 tons.

**Gas engines using blast-furnace gas.**—In 1919 there were 195 gas engines with a total rating of 514,470 horsepower, using blast-furnace gas, 115 for driving blowing engines and 80 for the production of electric current.

**Slag pits.**—There were 94 slag pits reported in 1919 serving 108 furnaces, with a production of 5,031,743 tons of granulated slag.

**Pig-iron casting machines.**—There was reported for the industry in the way of casting equipment, 149 pig-iron casting machines, comprising 79 of the Heyl and Patterson type, 56 of the Uehling type, and 14 of other patterns. In 1914 the total number was 112 and in 1909, 104. In 1919, 7,746,656 tons of pig iron were machine cast; in 1914, 6,007,417; and in 1909, 5,096,797 tons.

**Materials, products, and equipment in detail, by states.**—Detail statistics for 1919 of materials, products, and equipment, by states, are given in Table 24.

## MANUFACTURES.

TABLE 24.—DETAILED STATISTICS OF NUMBER OF ESTABLISHMENTS, MATERIALS, PRODUCTS, AND EQUIPMENT BY STATES: 1919.

[Ton, 2,240 pounds, except as otherwise stated.]

	United States.	Alabama.	Illinois.	Indiana.	Michigan.	New York.	Ohio.	Pennsylvania.	Tennessee.	Virginia.	All other states. <sup>1</sup>
Number of establishments.....	2,200	21	5	3	11	9	42	163	8	12	26
MATERIALS.											
Total cost.....	\$626,675,640	\$41,871,012	\$51,526,758	\$40,022,880	\$10,238,421	\$40,311,052	\$137,686,107	\$250,349,277	\$4,560,316	\$8,270,165	\$35,773,652
Iron ore:											
Tons.....	55,865,997	5,025,183	4,702,522	4,156,579	703,176	3,712,658	12,449,590	20,935,653	386,007	567,784	3,136,895
Cost.....	\$307,714,137	\$14,772,862	\$26,160,200	\$20,001,389	\$4,058,220	\$17,655,357	\$71,456,065	\$132,031,628	\$1,415,291	\$2,017,312	\$17,245,804
Crude iron ore—											
Domestic—											
Tons.....	53,696,285	4,879,129	4,665,261	4,152,560	791,672	3,674,191	12,430,650	19,866,526	302,141	330,605	2,543,550
Cost.....	\$203,637,171	\$13,929,561	\$25,977,338	\$10,986,449	\$4,050,159	\$17,205,742	\$71,387,088	\$124,205,284	\$1,255,121	\$1,651,412	\$13,983,017
Foreign—											
Tons.....	370,794	.....	.....	.....	.....	.....	.....	162,555	4,635	.....	203,604
Cost.....	\$3,040,227	.....	.....	.....	.....	.....	.....	\$1,774,775	\$63,161	.....	\$1,202,291
Calcined, roasted, or treated ore—											
Domestic—											
Tons.....	981,336	32,114	.....	.....	.....	37,319	.....	508,759	.....	155,150	247,994
Cost.....	\$5,080,872	\$143,090	.....	.....	.....	\$415,032	.....	\$3,377,857	.....	\$701,230	\$1,232,063
Foreign—											
Tons.....	163,985	.....	.....	.....	.....	.....	.....	77,538	616	.....	88,831
Cost.....	\$1,274,144	.....	.....	.....	.....	.....	.....	\$707,861	\$6,796	.....	\$499,487
Manganiferous ore—											
Domestic—											
Tons.....	364,771	80,976	37,061	4,010	.....	1,148	6,435	172,060	.....	7,062	55,401
Cost.....	\$2,220,499	\$527,444	\$182,445	\$14,010	.....	\$4,583	\$37,667	\$1,073,265	.....	\$52,970	\$327,195
Foreign—											
Tons.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cost.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pyrite cinder—											
Domestic—											
Tons.....	283,023	32,964	200	.....	1,504	.....	12,505	148,206	18,615	68,514	515
Cost.....	\$1,508,471	\$172,767	\$426	.....	\$2,061	.....	\$31,320	\$832,586	\$60,213	\$377,947	\$1,151
Foreign—											
Tons.....	5,803	.....	.....	.....	.....	.....	.....	.....	5,803	.....	.....
Cost.....	\$43,753	.....	.....	.....	.....	.....	.....	.....	\$43,753	.....	.....
Scrap (not produced at furnace in 1919):											
Tons.....	1,057,908	216,257	42,980	58,016	1,448	31,513	147,702	488,529	2,288	4,311	63,874
Cost.....	\$10,564,169	\$2,637,255	\$730,448	\$800,256	\$38,491	\$521,620	\$2,129,315	\$7,487,192	\$40,010	\$70,544	\$1,021,129
Mill cinder, scale, slag, flue dust, etc. (not produced by furnace reporting):											
Tons.....	2,378,943	90,739	152,329	226,370	14,877	49,323	611,927	979,680	39,060	15,200	199,180
Cost.....	\$0,709,183	\$131,590	\$298,611	\$286,141	\$41,643	\$147,702	\$1,841,877	\$3,244,343	\$186,101	\$73,241	\$449,989
Fixing materials:											
Tons (2,000 pounds).....	15,599,604	711,903	1,052,534	922,106	119,503	1,057,350	3,484,609	8,857,880	132,325	228,723	1,032,662
Cost.....	\$25,722,688	\$1,237,678	\$1,298,231	\$948,774	\$117,910	\$1,482,913	\$6,054,043	\$12,378,781	\$140,863	\$330,125	\$1,727,370
Fuel for smelting:											
Coke—											
Tons (2,000 pounds).....	34,605,700	3,216,168	2,595,548	2,366,334	245,353	2,318,570	7,715,245	13,335,275	322,357	452,002	2,042,888
Cost.....	\$223,260,607	\$18,402,140	\$20,007,272	\$16,101,338	\$1,936,257	\$17,855,628	\$40,600,139	\$81,224,835	\$2,341,837	\$3,572,825	\$10,308,586
Coal—											
Tons (2,000 pounds).....	51,739	.....	.....	.....	.....	23,103	28,680	.....	.....	.....	.....
Cost.....	\$266,494	.....	.....	.....	.....	\$70,133	\$106,361	.....	.....	.....	.....
Charcoal—											
Bushels.....	31,831,134	3,242,527	.....	.....	21,382,919	.....	180,010	.....	.....	7,116,678	.....
Cost.....	\$5,684,243	\$605,037	.....	.....	\$4,042,145	.....	\$30,260	.....	.....	\$907,801	.....
All other materials, cost.....	\$40,764,114	\$6,078,450	\$3,022,087	\$1,815,982	\$163,755	\$2,647,823	\$0,534,535	\$13,746,877	\$332,314	\$1,298,118	\$2,023,273
PRODUCTS.											
Total value.....	\$301,002,345	\$57,018,105	\$64,762,411	\$52,533,807	\$13,533,739	\$51,001,000	\$170,233,435	\$317,075,398	\$6,217,503	\$10,097,816	\$48,387,572
The blast-furnace industry, value.....	\$704,466,558	\$57,018,105	\$64,762,411	\$52,533,807	\$13,533,739	\$51,001,000	\$170,233,435	\$311,080,081	\$6,217,503	\$10,097,816	\$48,387,572
Subsidiary pig-iron products (other industries). . . . .	\$6,505,787	.....	.....	.....	.....	.....	.....	\$6,505,787	.....	.....	.....
Pig iron:											
Tons (gross).....	30,513,167	2,111,381	2,528,888	2,292,562	420,301	1,890,904	7,073,337	12,014,112	182,033	291,117	1,738,442
Value.....	\$785,900,412	\$54,771,825	\$61,734,028	\$51,501,407	\$13,512,966	\$50,212,451	\$176,592,090	\$314,253,642	\$6,150,705	\$9,232,864	\$47,900,974
For consumption by company producing—											
Tons.....	21,687,376	1,004,661	2,105,640	(*)	(*)	873,810	5,327,132	9,331,630	.....	(*)	1,011,681
Assigned value.....	\$523,533,054	\$22,348,145	\$49,883,117	(*)	(*)	\$10,091,910	\$120,343,702	\$235,317,019	.....	(*)	\$26,113,169
For sale—											
Tons.....	8,855,701	1,106,720	423,248	(*)	(*)	1,017,184	1,746,205	2,682,482	182,033	(*)	726,881
Value.....	\$202,427,358	\$32,423,680	\$11,851,811	(*)	(*)	\$81,120,532	\$50,248,988	\$78,036,523	\$6,150,705	(*)	\$21,793,805
Blast-furnace gas used as fuel for steam and for gas engines, coal equivalent, tons (gross).....	7,259,875	883,895	853,644	686,708	(*)	450,867	1,408,280	2,608,255	(*)	(*)	158,027
Blast-furnace department (tons, gross).....	4,977,003	(*)	(*)	(*)	(*)	(*)	1,061,875	2,024,690	(*)	(*)	122,549
Other departments—											
Tons (gross).....	2,282,872	(*)	(*)	(*)	(*)	(*)	433,414	641,605	.....	.....	35,478
Assigned value.....	\$5,200,637	(*)	(*)	(*)	(*)	(*)	\$695,302	\$1,374,812	.....	.....	\$168,377
All other products, including amount received for custom work.....	\$750,585	\$42,232	.....	.....	(*)	\$33,108	\$528,421	\$44,200	\$5,844	(*)	\$55,080
Pig iron, classified by smelting fuel:											
Coke—											
Tons.....	30,007,220	2,087,783	2,528,888	2,292,562	198,804	1,800,904	7,037,592	11,018,501	182,033	201,117	1,668,946
For consumption.....	21,636,861	1,004,661	2,105,640	.....	.....	873,810	5,327,096	9,331,630	.....	(*)	1,011,121
For sale.....	\$8,410,359	1,083,122	423,248	.....	.....	1,017,184	1,710,496	2,586,871	182,033	(*)	657,825
Value.....	\$770,101,169	\$53,620,013	\$61,734,928	\$51,501,407	\$8,021,710	\$50,212,451	\$175,207,027	\$311,194,581	\$6,150,705	\$9,232,864	\$45,135,414
Bituminous coal and coke											
Tons.....	35,745	.....	.....	.....	.....	35,745	.....	.....	.....	.....	.....
Value.....	\$1,385,663	.....	.....	.....	.....	\$1,385,663	.....	.....	.....	.....	.....

<sup>1</sup> All other states embrace: Colorado, 1 establishment; Connecticut, 1; Kentucky, 4; Maryland, 2; Massachusetts, 1; Minnesota, 2; Missouri, 3; New Jersey, 3; Texas, 1; Washington, 1; West Virginia, 4; and Wisconsin 3.<sup>2</sup> Includes 5 establishments with \$5,389,144 cost of materials, engaged primarily in the manufacture of ferroalloys, which produced 265,876 tons of pig iron, value \$6,592,231.<sup>3</sup> Includes 25,133 gross tons of anthracite (28,171 net tons) costing \$194,280 and 23,568 net tons of bituminous coal, costing \$72,219.<sup>4</sup> Included in totals but amount not shown to avoid disclosure of individual operations.

## BLAST FURNACES.

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TABLE 24.—DETAILED STATISTICS OF NUMBER OF ESTABLISHMENTS, MATERIALS, PRODUCTS, AND EQUIPMENT, BY STATES: 1919—Continued.

[Ton, 2,240 pounds, except as otherwise stated.]

	United States.	Alabama.	Illinois.	Indiana.	Michigan.	New York.	Ohio.	Pennsylvania.	Tennessee.	Virginia.	All other states. <sup>1</sup>
<b>PRODUCTS—continued.</b>											
Pig iron, classified by smelting fuel—											
Continued.											
Anthracite coal and coke—											
Tons.....	94,465							94,465			
Value.....	\$2,975,470							\$2,975,470			
Charcoal—											
Tons.....	315,737	23,508			221,497			1,146			66,496
Value.....	\$11,498,110	\$1,151,812			\$7,491,247			\$83,491			\$2,771,560
Pig iron, classified by grades (tons):											
Basic.....	14,597,535	(1)	(1)	2,095,431	(1)	944,783	2,550,134	6,625,835			631,509
For consumption.....	12,690,787	(1)	(1)	(1)		834,278	1,946,038	5,725,410			510,016
For sale.....	1,906,748	(1)	(1)	(1)		110,505	604,098	900,425			121,493
Bessemer.....	9,374,950		1,421,931				(1)	3,356,790	4,094,214		498,763
For consumption.....	8,558,930							3,288,849	3,508,524		463,389
For sale.....	816,020		(1)					67,950	555,690		35,374
Low phosphorus.....	289,726	(1)				(1)	(1)	153,718	(1)		
For consumption.....	9,665	(1)						(1)	(1)		
For sale.....	280,061	(1)						(1)	(1)		
Foundry.....	4,792,961	1,129,650	(1)	(1)	346,611	717,550	649,619	817,883	150,615	290,086	456,411
For consumption.....	193,034	104,445	(1)	(1)	(1)	(1)	(1)	4,460	11,887		29,173
For sale.....	4,598,927	1,025,205	(1)	(1)	(1)	(1)	(1)	645,153	805,998	150,615	290,086
Malleable.....	1,090,344		107,802	(1)		148,095		364,614	157,510		129,060
For consumption.....	13,634		(1)	(1)							5,134
For sale.....	1,076,710		(1)	(1)		148,095		364,614	157,516		123,926
Forgo or mill.....	287,529	16,891	(1)	(1)	(1)			122,632	148,008		
For consumption.....	108,590	(1)						(1)	(1)		
For sale.....	118,039	(1)						(1)	(1)		
White, mottled, and miscellaneous grades.....	50,418	(1)				5,907	11,602	1,349		(1)	
For consumption.....	9,405	(1)								(1)	
For sale.....	47,013	(1)				5,907	11,602	1,340		(1)	
Castings made direct from blast furnaces.....	53,704	(1)	772	(1)		(1)	7,340	15,591			488
Pig iron, classified by method of delivery or casting:											
Delivered molten to steel works, etc.....	18,138,453	888,087	1,937,647	1,790,527		743,763	4,036,452	8,026,694			709,283
Machine cast.....	7,746,656	111,522	500,460	494,004		180,060	667,703	2,078,216	8,071,311		553,281
Sand cast.....	3,070,300	950,440				240,241	478,943	677,157	727,101	182,093	281,722
Chill cast.....	634,045	125,345						274,172	173,415		9,395
Castings made direct from blast furnace.....	53,704	20,987	772	1,941		585	7,340	15,591			488
<b>EQUIPMENT.</b>											
Furnaces in active establishments:											
Completed furnaces at end of year—											
Number.....	411	42	24	16	12	25	77	2,149	10	13	43
Daily capacity, tons.....	138,347	10,060	11,675	8,290	1,530	9,176	28,918	55,557	1,139	1,830	10,172
Active during the year—											
Number.....	385	39	24	16	12	21	77	140	8	12	36
Daily capacity, tons.....	132,114	9,651	11,675	8,290	1,530	7,676	28,918	52,817	854	1,680	9,023
Coke furnaces—											
Number.....	350	37	24	16	3	21	75	133	8	12	30
Daily capacity, tons.....	130,291	9,520	11,675	8,290	755	7,676	28,778	52,369	854	1,680	8,688
Bituminous coal and coke mixed furnaces—											
Number.....	2							2			
Daily capacity, tons.....	140							140			
Anthracite coal and coke mixed furnaces—											
Number.....	5							5			
Daily capacity, tons.....	438							438			
Charcoal furnaces—											
Number.....	10	2			9			2			6
Daily capacity, tons.....	1,245	125			775			10			335
Idle during the entire year—											
Number.....	27	3			4			10	2	1	7
Daily capacity, tons.....	6,433	400			1,500			2,940	285	150	1,149
Coke furnaces—											
Number.....	25	2			4			10	2	1	6
Daily capacity, tons.....	0,343	334			1,500			2,940	285	150	1,134
Charcoal furnaces—											
Number.....	2	1									1
Daily capacity, tons.....	90	76									15
Banked, relined, or rebuilding at end of year—											
Coke—											
Number.....	59	2	6	3	1	10	8	20	2	3	6
Daily capacity, tons.....	20,506	475	2,700	1,540	80	4,025	2,248	7,160	205	375	1,640
Other fuels (charcoal, anthracite, bituminous coal and coke)—											
Number.....	3							1			
Daily capacity, tons.....	256							90	75		
New furnaces completed since 1914—											
Number (all coke).....	31	1	1	6		3	4	12			4
Daily capacity, tons.....	14,515	100	550	3,130		1,500	2,000	5,615			1,650
In course of construction at end of year—											
Number (coke 4, charcoal 1).....	5							1	1		3
Daily capacity, tons.....	1,720							600	70		1,050
Abandoned or dismantled since 1914—											
Number (coke).....	8	1						3			3
Daily capacity, tons.....	1,560	200						800		150	410
Pig-iron casting machines.....											
Granulated slag pits:—											
Number.....	94	-1	5	5		6	22	42			13
Number of blast furnaces served.....	108	1	8	10		6	25	45			13
Gas engines using blast-furnace gas:—											
Number.....	195					12	57	29	22	57	
Blowing blast furnaces.....	115					9	23	21	8	37	
Production of electric current.....	80					3	34	8	14	20	
Horsepower.....	513,470					35,000	171,400	50,000	60,000	146,700	
											41,370

<sup>1</sup> Included in totals but amount not shown to avoid disclosure of individual operations.<sup>2</sup> Not including 1 stack of 200 tons capacity abandoned April, 1919.

## MANUFACTURES.

## GENERAL TABLES.

Comparative statistics, by states.—Table 25 gives the comparative statistics for the principal items, number of establishments, average number of wage earners, primary horsepower, wages, cost of materials, earners, primary horsepower, wages, cost of materials,

and value of products for the census years 1919, 1914, and 1909.

Detailed statistics, by states.—Table 26 is a detailed statement, by states, census of 1919.

TABLE 25.—COMPARATIVE SUMMARY, BY STATES: 1919, 1914, AND 1909.

STATE.	Cen-sus year.	Num-ber of es-tab-lish-ments.	Wage earners (aver-age num-ber).	Primary horse-power.	Wages.	Materi-als.	Value of prod-ucts.	STATE.	Cen-sus year.	Num-ber of es-tab-lish-ments.	Wage earners (aver-age num-ber).	Primary horse-power.	Wages.	Materi-als.	Value of prod-ucts.
United States <sup>1</sup>	1919	195	41,660	1,581,432	\$73,769	\$621,286	\$794,467	Ohio.....	1919	42	9,793	350,224	\$20,224	\$137,088	\$179,234
	1914	180	29,356	1,222,273	22,781	284,580	317,654		1914	33	5,789	232,179	5,171	60,739	72,969
	1909	208	33,429	1,173,422	24,007	320,638	301,420		1909	40	7,295	215,739	5,000	68,425	83,699
Alabama.....	1919	21	5,214	138,951	7,177	44,871	57,018	Pennsylvania <sup>1</sup> .....	1919	58	14,610	564,455	27,318	244,080	311,080
	1914	15	3,547	126,573	1,985	13,891	29,068		1914	52	11,518	477,588	9,337	115,501	135,806
	1909	19	3,783	106,189	2,077	15,477	21,236		1909	66	14,521	476,680	9,457	142,074	168,578
Illinois.....	1919	5	2,129	80,118	3,847	51,527	64,762	Tennessee.....	1919	8	884	15,978	883	4,566	8,218
	1914	5	1,450	94,160	1,348	21,704	25,862		1914	6	503	6,580	233	1,082	2,245
	1909	6	2,493	70,453	1,793	30,908	38,300		1909	13	1,143	18,150	519	3,381	4,653
Michigan.....	1919	11	1,101	6,367	1,719	10,298	13,534	Virginia.....	1919	12	1,081	19,855	1,027	8,270	10,098
	1914	12	991	14,045	782	3,877	5,450		1914	8	689	15,210	852	3,282	3,772
	1909	11	1,016	17,403	632	4,224	5,824		1909	14	1,320	17,320	546	4,418	5,389
New York.....	1919	9	2,210	146,500	4,020	40,311	51,602	All other states.....	1919	29	4,629	249,984	7,554	78,797	100,921
	1914	8	1,832	97,749	1,325	16,287	18,486		1914	21	3,040	168,189	2,218	27,527	32,998
	1909	9	2,298	95,416	1,758	20,917	26,621		1909	30	4,560	156,072	2,735	30,814	37,129

<sup>1</sup> Does not include statistics of 5 establishments engaged primarily in the manufacture of ferroalloys which produced 265,876 tons of pig iron valued at \$6,592,236 in 1919.

## BLAST FURNACES.

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TABLE 26.—DETAILED STATEMENT, BY STATES: 1919.

STATE.	Number of establishments.	PERSONS ENGAGED IN THE INDUSTRY.							WAGE EARNERS DEC. 15, OR NEAREST REPRESENTATIVE DAY.						EXPENSES.		
		Total.	Proprietors and firm members.	Salaries of officers, superintendents, and managers.	Clerks, etc.		Wage earners.			Total.	16 and over.		Under 16.		Capital.	Salaries and wages.	
					Male	Female	Average number.	Number, 15th day of—	Maximum month.		Male	Female	Male	Female		Officials.	Clerks, etc.
United States.....	195	46,056	41	1,341	3,031	883	41,660	Ja 51,467	Oc 33,028	46,460	46,402	54	4	.....	\$802,416,541	\$6,509,884	\$6,925,164
Alabama.....	21	5,785	1	155	339	76	5,214	Ja 6,435	My 4,009	5,848	5,833	15	.....	.....	76,762,096	588,179	772,068
Illinois.....	5	2,436	.....	97	151	59	2,129	Ja 2,571	Oc 1,219	2,418	2,417	1	.....	.....	57,167,029	393,135	386,598
Kentucky.....	4	513	.....	20	14	4	475	Ja 607	Je 108	536	530	.....	.....	.....	7,261,081	54,680	25,854
Michigan.....	11	1,203	.....	39	45	18	1,101	Ja 1,173	No 1,033	1,139	1,137	2	.....	.....	15,820,266	123,442	89,927
New Jersey.....	3	534	.....	16	18	13	487	Ja 763	Oc 352	395	303	2	.....	.....	6,227,356	81,549	41,079
New York.....	9	2,302	.....	60	76	16	2,210	Ja 2,558	Oc 1,589	2,271	2,269	2	.....	.....	68,297,002	358,252	228,470
Ohio.....	42	11,055	.....	311	747	204	9,703	Ja 12,137	Oc 6,105	11,211	11,203	8	.....	.....	182,007,954	1,292,048	1,014,580
Pennsylvania.....	58	10,667	.....	412	1,230	367	14,619	Ja 17,554	Oc 12,786	15,707	15,689	18	.....	.....	267,740,371	2,561,073	2,911,533
Tennessee.....	8	966	1	29	42	10	884	Ja 1,236	Jy 759	1,008	1,004	4	.....	.....	12,135,057	153,780	58,023
Virginia.....	12	1,180	.....	35	38	6	1,081	Ja 1,748	Je 687	1,004	1,600	4	.....	.....	12,455,938	122,270	55,235
West Virginia.....	4	524	.....	29	60	18	417	So 708	Je 252	746	749	.....	.....	.....	7,977,593	86,000	72,407
All other states <sup>1</sup> .....	18	3,751	.....	138	271	92	3,250	.....	.....	3,577	3,575	2	.....	.....	108,584,848	690,496	667,270
EXPENSES—continued.																	
STATE.	Salaries and wages—Con.	Rent and taxes.			For materials.			Value of products.	Value added by manufacture.	POWER.						Electric horse-power generated in establishments reporting.	
		For contract work.	Rent of factory.	Taxes, Federal, state, county, and local.	Principal materials.	Fuel and rent of power.	Total.			Steam engines (not turbines).	Steam turbines.	Internal-combustion engines.	Water power. <sup>2</sup>	Rent-ed. <sup>3</sup>			
United States.....	\$73,709,305	\$602,293	\$384,763	\$20,551,798	\$385,662,843	\$235,028,653	\$704,406,555	\$173,180,062	1,581,432	897,501	252,316	233,015	371	48,229	194,350		
Alabama.....	7,177,159	4,077	.....	780,485	24,302,536	20,508,476	57,018,105	12,147,093	138,951	108,401	29,003	.....	.....	1,547	9,996		
Illinois.....	3,846,614	.....	2,921,894	30,839,824	20,686,984	04,762,411	13,235,653	80,118	54,870	10,148	15,300	.....	.....	.....	35,155		
Kentucky.....	569,772	.....	90,456	2,262,448	1,359,177	4,465,149	863,524	13,481	13,106	375	.....	.....	.....	.....	979		
Michigan.....	1,710,380	.....	565,618	4,904,869	5,303,552	13,533,739	3,235,318	6,367	4,805	1,125	.....	.....	.....	.....	437	2,403	
New Jersey.....	653,040	.....	110,375	1,518,403	1,229,118	3,855,352	1,110,741	12,958	10,900	1,970	.....	.....	.....	.....	28	300	
New York.....	4,019,818	177,018	3,135,801	21,999,130	19,311,022	51,601,099	11,290,947	146,500	78,055	12,047	44,320	.....	.....	.....	12,078	5,778	
Ohio.....	20,223,081	112,064	481	3,552,844	88,780,004	48,906,108	179,238,435	41,547,328	359,224	222,164	70,494	38,555	.....	.....	28,011	48,283	
Pennsylvania.....	27,318,410	620,119	187,372	3,044,117	162,977,265	81,982,868	311,080,081	66,119,948	564,455	401,468	73,442	86,635	140	2,770	.....	10,849	
Tennessee.....	882,634	.....	9,900	273,265	1,908,757	2,590,559	1,651,277	15,978	15,016	950	5	7	.....	.....	1,570		
Virginia.....	1,026,940	.....	354	171,104	4,417,554	3,852,611	10,097,816	1,827,651	19,855	14,835	4,870	.....	.....	150	.....	1,089	
West Virginia.....	849,587	.....	95,258	3,770,058	1,740,431	6,411,939	901,450	19,360	14,260	8,100	.....	.....	.....	.....	8,798		
All other states <sup>1</sup> .....	5,486,101	54,543	9,043	5,193,232	37,930,805	28,905,002	86,185,039	19,250,132	204,185	62,761	39,792	68,200	74	3,358	.....	69,150	

<sup>1</sup> All other states embrace: Colorado, 1 establishment; Connecticut, 1; Indiana 3; Maryland, 2; Massachusetts, 1; Minnesota, 2; Missouri 3; Texas, 1; Washington, 1; and Wisconsin 3.<sup>2</sup> Includes water wheels and turbines (irrespective of ownership of water supply) and water motors (operated by water from city mains).<sup>3</sup> Chiefly electric motors operated by rented (or purchased) current; other power included (chiefly shaft-belt or transmitted power from neighboring power plants).

## FERROALLOYS.

### GENERAL STATISTICS.

**General character of the industry.**—In 1914 and at prior censuses, the blast-furnace ferroalloys, spiegel-eisen, ferromanganese, ferrosilicon, etc., were included in the blast-furnace industry, though reported separately, and the ferroalloys produced by electro-thermic, electrochemical, or other processes were included in the group of the chemical industry designated as "chemical substances produced by the aid of electricity."

The present report presents the statistics for ferroalloys as a classified industry inclusive of (1) blast-furnace products; and (2) electric-furnace products.

Comparative figures for previous years are not available for the industry as a whole. The general statistics will be found in Table 33.

**States, ranked by value of products.**—The leading states, ranked by value of products for the classified industry, are Pennsylvania, Ohio, Tennessee, Virginia, New York, Alabama, and Colorado, but there is a large production of ferroalloys by establishments engaged primarily in the manufacture of other products, amounting in the aggregate to \$17,598,259, which production is included in the statistics for products as given in Table 32, and the distribution of these products, by states, would materially affect the rank of some of the states.

**Persons engaged in the industry.**—There were 2,750 persons engaged in the industry in 1919, comprising 2,344 wage earners, 8 proprietors, 49 salaried officers of corporations, 110 superintendents and managers, and 239 clerks or other subordinate salaried employees. The females reported include 64 clerks and 9 wage earners over 16 years of age.

**Wage earners, by months.**—Table 27 shows, by months and by states, the number of wage earners employed on representative days, and the per cent

the number reported for the minimum month is of the maximum month.

**Prevailing hours of labor.**—Figures are not available to show the changes since the last census in the prevailing hours of labor for the establishments involved. The industry calls for continuous furnace operations, and Table 28 indicates that the majority of the wage earners are found in the higher groups.

**Size of establishments, by average number of wage earners.**—Table 29 gives the average number of wage earners employed in the industry, classified according to number per establishment. There were 7 establishments, or 23.3 per cent of the total number, that employed over 100 wage earners per establishment, aggregating 66.6 per cent of all wage earners for the industry.

**Size of establishments, by value of products.**—The industry is one of relatively large units, as shown by Table 30. Only 3 establishments in 1919 reported products less than \$100,000 per establishment, these representing but a fraction of 1 per cent of the wage earners and of the total value of products.

**Character of ownership.**—Of the 30 establishments constituting the classified industry, 27 are corporations, and 3 are owned by individuals or firms.

**Number and horsepower of types of prime movers.**—The power equipment reported for the industry aggregates 37,087 horsepower. While rented electric power formed only 12.3 per cent of the total primary power, a large proportion of the owned power was transformed into electric power, representing 59.8 per cent of the total owned power. The details of power equipment are given in Table 33.

**Fuel consumed.**—Table 31 gives the statistics, by states, of the quantities of the different kinds of fuel consumed, including smelting fuel as well as fuel consumed for power purposes.

**TABLE 27.—WAGE EARNERS, BY MONTHS: 1919.**

[Month of maximum employment for each state is indicated by bold-faced figures and that of minimum employment by *italic* figures.]

STATE.	Average number employed during year.	NUMBER EMPLOYED ON 15TH DAY OF THE MONTH OR NEAREST REPRESENTATIVE DAY.												Per cent minimum is of maximum.
		January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	
United States.....	2,344	<b>2,933</b>	2,692	2,378	2,267	2,096	2,060	<i>1,879</i>	1,971	2,103	2,415	2,572	2,756	64.1
Male.....	<b>2,335</b>	<b>2,924</b>	2,683	2,369	2,258	2,087	2,056	<i>1,870</i>	1,962	2,095	2,406	2,563	2,747	64.0
Female.....	9	9	9	9	9	9	10	9	9	8	9	9	9	80.0
Colorado.....	59	88	79	54	55	48	50	48	54	49	47	64	74	52.3
Pennsylvania.....	1,500	<b>1,714</b>	1,658	1,491	1,392	1,459	1,391	<i>1,349</i>	1,362	1,493	1,501	1,585	1,602	78.7
Tennessee.....	150	149	149	145	138	104	142	171	180	153	156	161	161	57.5
All other states.....	635	982	806	688	682	485	483	313	375	408	712	767	919	31.9

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TABLE 28.—AVERAGE NUMBER OF WAGE EARNERS, BY PREVAILING HOURS OF LABOR PER WEEK FOR STATES: 1919.

STATE.	Total.	IN ESTABLISHMENTS WHERE THE PREVAILING HOURS OF LABOR PER WEEK WERE—						STATE.	Total.	IN ESTABLISHMENTS WHERE THE PREVAILING HOURS OF LABOR PER WEEK WERE—					
		48.	Between 48 and 54.	54.	Between 54 and 60.	60.	Over 60.			48.	Between 48 and 54.	54.	Between 54 and 60.	60.	Over 60.
United States.....	2,344	92	.....	75	224	845	1,108	Pennsylvania.....	1,500	41	.....	26	712	721	
Colorado.....	59	31	.....	28	.....	.....	.....	Tennessee.....	150	.....	.....	26	150	150	
All other states.....	635	20	.....	75	176	133	237	All other states.....	635	20	.....	75	176	133	237

TABLE 29.—SIZE OF ESTABLISHMENTS, BY AVERAGE NUMBER OF WAGE EARNERS, FOR STATES: 1919.

STATE.	TOTAL.		ESTABLISHMENTS EMPLOYING—											
	Establishments.	Wage earners (average number).	1 to 5 wage earners, inclusive.		6 to 20 wage earners, inclusive.		21 to 50 wage earners, inclusive.		51 to 100 wage earners, inclusive.		101 to 250 wage earners, inclusive.		Over 250 wage earners.	
			Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.
United States.....	30	2,344	3	11	4	57	10	341	6	375	4	458	3	1,102
Colorado.....	3	59	1	3	.....	.....	2	56	.....	.....	2	233	3	1,102
Pennsylvania.....	10	1,500	.....	.....	.....	.....	5	165	.....	.....	1	103	.....	.....
Tennessee.....	3	150	.....	.....	1	15	1	32	.....	.....	1	122	.....	.....
All other states.....	14	635	2	8	3	42	2	88	6	375	1	.....	.....	.....

TABLE 30.—SIZE OF ESTABLISHMENTS, BY VALUE OF PRODUCTS: 1919.

VALUE OF PRODUCT.	Number of establishments.	Average number of wage earners.	Value of products.	Value added by manufacture.	VALUE OF PRODUCT.		PER CENT DISTRIBUTION.			
					Number of establishments.	Average number of wage earners.	Value of products.	Value added by manufacture.	.....	.....
All classes.....	30	2,344	\$38,583,984	\$10,485,408	All classes.....	100.0	100.0	100.0	100.0	100.0
Less than \$100,000.....	3	11	70,383	27,530	Less than \$100,000.....	10.0	0.4	0.2	0.3	.....
\$100,000 to \$500,000.....	14	452	3,770,588	1,242,944	\$100,000 to \$500,000.....	46.7	19.3	9.8	11.9	.....
\$500,000 to \$1,000,000.....	6	446	3,891,407	1,312,185	\$500,000 to \$1,000,000.....	20.0	19.0	10.1	12.5	.....
\$1,000,000 and over.....	7	1,430	30,881,546	7,902,749	\$1,000,000 and over.....	23.2	61.3	79.9	75.7	.....

TABLE 31.—FUEL CONSUMED, BY STATES: 1919.

STATE.	COAL.		STATE	COAL.		STATE	COAL.		STATE
	Anthracite <sup>1</sup> (tons, 2,240 pounds)	Bituminous (tons, 2,000 pounds)		Coke (tons, 2,000 pounds)	Fuel oils (barrels)		Anthracite <sup>1</sup> (tons, 2,240 pounds)	Bituminous (tons, 2,000 pounds)	
United States.....	2,005	83,651	815,322	1,000	350	4,400	901	51,267	601,797
Colorado.....	284	1,000	808	.....	.....	.....	820	31,824	41,855
									80,962
									933
									253

<sup>1</sup> Includes some semianthracite.

## SPECIAL STATISTICS.

Materials and products.—Table 32 gives the detailed statistics for the principal materials and the products, for the census of 1919.

The production of blast-furnace ferroalloys in 1919 aggregated 324,273 tons as compared with 329,580 tons in 1914, a decrease of 1.6 per cent. In 1909 the

production of blast-furnace ferroalloys was 326,970 tons, and in 1904, 280,259 tons. The production for 1919 includes 84,010 tons of spiegeleisen, 182,966 tons of ferromanganese, 53,516 tons of ferrosilicon, and 3,781 tons of ferrophosphorus and other ferroalloys.

## MANUFACTURES.

TABLE 32.—MATERIALS AND PRODUCTS: 1919.

MATERIALS.	Tons (2,000 pounds).	Cost.	PRODUCTS.	Tons (2,000 pounds).	Value.
Total cost.....	\$38,172,204		Total value.....		\$56,182,243
The ferroalloys industry.....	28,098,576		The classified industry.....		38,583,934
Other industries producing ferroalloys as subsidiary products.....	10,073,628		Ferroalloys, subsidiary products of other industries.....		17,598,259
Ores.....	886,227	22,947,159	Blast-furnace establishments.....		38,484,505
Domestic.....	621,865	9,885,281	Electric-furnace establishments.....		17,697,733
Foreign.....	264,362	13,031,878	Ferroalloys.....	Tons.	
Manganese or manganiferous.....	512,580	17,153,567	Ferromanganese.....	385,806	49,328,769
Chrome.....	59,115	2,123,508	Spiegelisen.....	185,616	25,670,127
All other.....	314,532	3,670,084	Ferrosilicon.....	81,010	3,075,659
Fluxes.....	310,909	655,875	Ferrophosphorus.....	86,022	4,821,711
Fuel for smelting.....		5,281,108	Other ferroalloys (ferrochrome, molybdenum, titanium, tungsten, vanadium, etc.).....	4,757	516,231
Coke.....	715,731	4,740,285		25,401	14,643,011
Other.....		540,823	Sand cast.....	148,875	
Kilowatt hours.....	187,750,817	983,328	Machine cast.....	131,419	
Electric power purchased.....		8,304,734	Chill cast.....	105,299	
All other materials including fuel for power.....			Delivered in molten condition.....	213	
			All other products.....		6,855,474

## GENERAL TABLE.

Detailed statement, by states.—Table 33 presents, by states, the detailed statistics for the industry for 1919.

The 30 establishments include 14 making blast-furnace products and 16 electric-furnace products: the

blast-furnace ferroalloy establishments being distributed, by states, as follows—Colorado, 1; New Jersey, 1; Ohio, 2; Pennsylvania, 7; Tennessee, 2; and Virginia, 1.

TABLE 33.—DETAILED STATEMENT, BY STATES: 1919.

STATE.	Number of establish-ments	PERSONS ENGAGED IN THE INDUSTRY.						WAGE EARNERS DEC. 15 OR NEAREST REPRESENTATIVE DAY.				EXPENSES.					
		Total.	Propri- tors and firm mem- bers.	Sal- ried offi- cers, su- perin- tend- ents, and man- agers.	Clerks, etc.		Wage earners.		Total.	16 and over.		Under 16.					
					Male.	Fe- male.	Aver- age num- ber.	Number, 15th day of—		Male.	Fe- male.	Male.	Fe- male.				
United States.....	30	2,750	8	159	175	64	2,344	Ja 2,933	Jy 1,870	3,204	3,102	10	2	....	\$42,364,720	\$732,084	\$389,030
Colorado.....	3	87	7	19	7	2	.59	Ja 88	Jy 46	74	73	1	....	....	729,399	37,931	13,749
Pennsylvania.....	10	1,679	7	34	106	32	1,500	Ja 1,714	Jy 1,349	1,715	1,707	7	1	....	28,079,783	274,707	326,915
Tennessee.....	3	175	1	13	8	3	.150	Au 180	My 104	174	174	....	....	....	595,042	40,194	11,472
All other states <sup>1</sup> .....	14	809	....	93	54	27	635	....	....	1,241	1,238	3	....	....	12,960,505	379,252	136,594

STATE.	EXPENSES—continued.						Value of products.	Value added by manufac-ture.	POWER.				Electric horse-power generated in establish-ments reporting.					
	Salaries and wages—Continued.	Rent and taxes.		For materials.					Primary horsepower.									
		For contract work.	Taxes, Federal, state, county, and local.	Principal materials.	Fuel and rent of power.	Total.			Owned.	Rented electric.								
Wage earners.									Steam engines (not turbines).	Steam turbines.	Internal-combustion engines.							
United States.....	\$3,571,487	\$47,338	\$13,377	\$873,052	\$22,039,508	\$6,059,068	\$38,583,934	\$10,485,408	37,087	32,235	185	88	4,579	10,456				
Colorado.....	95,829	....	240	6,905	237,576	74,646	529,562	217,340	301	....	....	....	301	....				
Pennsylvania.....	2,553,600	5,140	6,900	465,503	19,360,571	4,200,322	31,419,460	7,858,567	26,831	25,385	....	....	1,446	18,774				
Tennessee.....	113,663	897	6,901	311,918	421,700	1,297,837	564,219	2,005	2,000	186	88	5	661	21				
All other states <sup>1</sup> .....	808,386	42,198	5,340	393,653	2,120,443	1,362,400	5,337,125	1,345,282	7,950	4,850	....	....	2,827	....				

<sup>1</sup> All other states embrace: Alabama, 1 establishment; California, 2; District of Columbia, 1; Iowa, 1; Maryland, 1; New Jersey, 1; New York, 3; Ohio, 2; Virginia, 1; and Washington, 1.

## STEEL WORKS AND ROLLING MILLS.

### GENERAL STATISTICS.

**General character of the industry.**—Under this heading is included all establishments engaged primarily in the conversion of iron into steel, and the hot-rolling of iron and steel. Besides the 500 establishments falling within the classified industry, 7 establishments engaged primarily in other lines of manufacture produced steel or did hot-rolling as subsidiary lines. These are included in the following industries: Foundry and machine shop products, 3; steam-railroad cars, 2; electrical machinery, apparatus and supplies, 1; and iron and steel forgings, 1. Data for these establishments are not included in the general statistics of this report, but the value of the steel castings and rolled steel products manufactured in 1919 was \$7,143,128, of which \$1,861,964 was for consumption by the producing establishment and \$5,281,164 was for sale. In many establishments manufacture or fabrication was carried on beyond the primary stage, and the statistics include the manufacture and fabrication of products of rolling mills when the operations are in direct connection with the rolling mill. This includes, for example, the tin-dipping department of a black-plate rolling mill, the wire-drawing department of a wire-rod mill, and the pipe-and-tube department of a skelp mill when parts of one plant. The finished products, however, are considered in connection with the statistics for the respective industries to which they relate and the statistics for tin plate and terne-plate and for wire, in the sections of this report pertaining to these products, cover total production, whether made in independent plants or in departments of rolling mills.

**Summary and comparison with earlier censuses.**—Table 34 summarizes the more important data relative to the industry for the censuses 1879 to 1919, inclusive, and gives the percentages of increase or decrease for the census periods.

**Classes of establishments.**—The establishments are divided into three classes: (1) Those equipped with steel furnaces and hot rolls (steel works and rolling mills), represented by 145 establishments, with products valued at \$1,865,305,000; (2) those equipped with steel furnaces only (steel works), 112 establishments and \$151,861,147 in value of products; and (3) those equipped with hot rolls only (rolling mills), 243 establishments and \$811,736,249 in value of products. The first group includes most of the larger establishments. All steel plants which are operated in conjunction

with blast furnaces have rolling departments. Statistics for these groups are given in Table 35 for 1919, 1914, and 1909, for the United States, and Pennsylvania and Ohio, and for Illinois and New York for 1919, these being the four states which ranked highest.

**Principal states, ranked by value of products.**—Table 36 gives, by states, ranked according to value of products, the average number of wage earners, value of products, and value added by manufacture, together with the relative rank held and the per cent of the total reported for each state under each classification. Colorado and Minnesota, included among "All other states," ranked fourteenth and sixteenth, respectively, on the basis of value of products.

**Persons engaged in the industry.**—Personnel statistics for 1919, 1914, and 1909 are presented in Table 37. Except in office work, where they form 23.6 per cent of the total, females constitute less than 1 per cent, and less than one-half of one-tenth of 1 per cent of the wage earners were under 16 years of age. In 1914 wage earners under 16 constituted three-tenths of 1 per cent of the total number and in 1909 one-half of 1 per cent.

**Wage earners, by months.**—Statistics of the number of wage earners, by months, for the United States, 1919, 1914, and 1909, and by states for 1919, are given in Table 38. The variation between minimum and maximum months in 1919 was somewhat greater than in 1914 and 1909, the percentages being 66.2, 77.4, and 75.8, respectively, seemingly an indication of an increase in labor turnover and less stability of the labor situation in the industry. The states showing the greatest variation are Delaware and Kentucky, and the least variation New Jersey and Alabama.

**Prevailing hours of labor.**—Table 39 distributes the wage earners according to the prevailing hours of labor per week, comparative figures being shown for the United States for 1919, 1914, and 1909, and by States for 1919 and 1914, or for 1919 when 1914 figures are not available. In 1919, 31.8 per cent were employed in establishments where the prevailing hours of labor per week were 48 or less; in 1914, 8 per cent; and in 1909, 7.6 per cent. The group "44 and under" carried 15 per cent of all wage earners in 1919. On the other hand, in 1909, 68.6 per cent of the wage earners were employed in establishments where the prevailing hours of labor were 60 or more per week compared with 55.5 in 1914 and 42.1 in 1919.

## MANUFACTURES.

**Size of establishments, by average number of wage earners.**—The movement towards the absorption of smaller establishments into greater aggregations of capital and facilities is shown by the classification according to wage-earner groups, presented in Table 40. Of a total increase, 1914 to 1919, of 73 establishments in the industry, 65 employed over 250 wage earners each, and while there was an increase in the number of wage earners in these establishments of 128,986, there was an actual decrease of 2,614 in the number employed in the smaller groups. In 1914 the average number of wage earners per establishment was 582, and in 1919, 750.

**Size of establishments, by value of products.**—Table 41 groups the establishments according to value of products for 1919, 1914, and 1909. Two-thirds of the establishments and over 95 per cent of the wage earners, value of products, and value added by manufacture were reported in the group with products of "\$1,000,000 and over." The average value of products per establishment was \$5,658,000 in 1919; \$2,151,000 in 1914; and \$2,210,000 in 1909, the increase for 1919 with respect to 1914 being largely due to high prices.

**Character of ownership.**—In Table 42 the number of establishments, average number of wage earners, and value of products is shown, classified by character of ownership, for 1919, 1914, and 1909. Corporation ownership is growing, both absolutely and relatively, the number being 481 compared with only 19 of all other classes.

**Number and horsepower of types of prime movers.**—Comparative power statistics for the last three census years are given in Table 43. Of the total horsepower, electric power, either rented or generated by the establishments using it, constituted 62 per cent in 1919, 44.6 per cent in 1914, and 34.1 per cent in 1909. The rapidly increasing use of rented or purchased electric power is disclosed, the percentage the same bears to the total primary power having increased from 2.8 per cent in 1909 to 6.7 per cent in 1914, and to 18.2 per cent in 1919.

**Fuel consumed.**—Table 44 presents, by states, comparative statistics of the quantities and kinds of fuel used for all purposes in the industry. The figures for gas include natural and manufactured gas.

TABLE 34.—COMPARATIVE SUMMARY: 1919, 1914, 1909, 1904, 1899, 1889, AND 1879.

	1919	1914	1909	1904	1899	1889	1879	PER CENT OF INCREASE. <sup>1</sup>					
								1914-1919	1909-1914	1904-1909	1899-1904	1889-1899	1879-1889
Number of establishments.....	500	427	446	415	445	415	451	17.1	-4.3	-7.5	-6.7	7.2	-8.0
Persons engaged.....	421,861	274,162	260,762	221,956	190,825	(2)	(2)	53.9	5.1	17.5	16.3	.....	.....
Proprietors and firm members.....	35	52	47	64	122	(2)	(2)	-32.7	10.6	-26.6	-47.5	.....	.....
Salaried employees.....	46,738	25,394	20,639	14,330	7,454	(2)	(2)	84.0	23.0	44.0	92.2	.....	.....
Wage earners (average number).....	375,088	248,716	240,076	207,562	183,240	137,766	99,103	50.8	3.6	15.7	13.3	33.0	(2)
Primary horsepower.....	3,820,017	2,706,553	2,100,978	1,640,299	1,100,801	535,430	(2)	41.2	28.8	27.4	49.8	105.6	.....
Capital.....	\$2,650,518,417	\$1,258,370,594	\$1,004,735,111	\$700,182,310	\$430,232,431	\$276,224,301	\$120,373,603	111.1	25.2	43.5	62.7	55.8	129.5
Salaries and wages.....	737,517,850	225,658,325	189,392,222	140,352,488	111,769,244	79,510,047	42,706,082	226.8	10.1	34.9	25.6	40.6	85.8
Salaries.....	99,880,420	37,515,927	26,191,464	17,860,495	9,433,368	(2)	(2)	166.3	43.2	46.6	89.3	.....	.....
Wages.....	637,637,430	188,142,398	163,200,758	122,491,903	102,336,876	(2)	(2)	238.0	15.3	33.2	19.7	.....	.....
Paid for contract work.....	2,963,415	251,082	94,237	115,563	547,216	.....	.....	1,080.3	166.4	-18.5	-78.9	.....	.....
Rent and taxes.....	88,102,211	6,063,587	3,657,314	4,2,616,000	4,2,058,847	.....	.....	1,353.0	65.8	.....	27.1	.....	.....
Cost of materials.....	1,680,575,758	590,825,692	657,500,856	441,204,432	390,893,277	217,174,230	132,651,408	184.4	-10.1	49.0	12.9	80.0	63.7
Value of products.....	2,828,902,376	918,664,585	985,722,534	673,965,026	597,211,716	383,044,366	207,242,116	207.9	-6.8	46.3	12.9	70.3	60.7
Value added by manufacture <sup>2</sup> .....	1,148,326,618	327,838,373	328,221,678	232,760,594	206,316,439	115,870,130	74,590,708	250.3	-0.1	41.0	12.8	78.1	55.3

<sup>1</sup> A minus sign (—) denotes decrease.

<sup>2</sup> Comparable figures not available.

<sup>3</sup> Percentage are omitted because figures are not strictly comparable.

<sup>4</sup> Exclusive of internal revenue.

<sup>5</sup> Value of products less cost of materials.

# STEEL WORKS AND ROLLING MILLS.

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TABLE 35.—CLASSES OF ESTABLISHMENTS: 1919, 1914, AND 1909.

STATE.	Census year.	Total.	Steel works and rolling mills combined.	Steel works only.	Rolling mills only.	PER CENT OF TOTAL.		
						Steel works and rolling mills.	Steel works only.	Rolling mills only.
United States:								
Number of establishments.....	1919	500	145	112	243	29.0	22.4	48.6
	1914	427	113	96	213	26.4	22.5	51.1
	1909	446	89	99	258	20.0	22.2	57.8
Value of products.....	1919	\$2,828,002,376	\$1,865,304,980	\$151,861,147	\$811,736,249	65.9	5.4	28.7
	1914	918,664,565	593,874,694	39,783,006	285,006,865	64.7	4.3	31.0
	1909	985,722,534	607,036,138	45,876,568	332,809,828	61.6	4.7	33.8
Pennsylvania:								
Number of establishments.....	1919	198	56	36	100	28.3	18.2	53.5
	1914	178	57	27	94	32.0	15.2	52.8
	1909	189	44	33	112	23.3	17.5	59.2
Value of products.....	1919	\$1,299,412,070	\$871,036,483	\$51,675,317	\$373,700,270	67.2	4.0	28.8
	1914	445,106,324	310,292,397	10,516,470	127,297,457	62.2	2.4	28.4
	1909	500,343,095	329,652,618	20,786,673	149,904,704	65.9	4.2	30.0
Ohio:								
Number of establishments.....	1919	86	24	16	46	27.9	18.6	53.5
	1914	70	16	14	40	22.9	20.0	57.1
	1909	75	13	13	49	17.3	17.3	55.3
Value of products.....	1919	\$826,370,025	\$402,707,332	\$10,668,044	\$203,994,649	64.3	3.1	32.6
	1914	205,023,391	122,970,850	6,098,171	75,956,370	60.0	2.9	37.1
	1909	107,780,043	100,230,521	5,117,556	92,422,666	50.7	2.6	46.7
Illinois:								
Number of establishments.....	1919	32	10	9	13	31.3	28.1	40.6
	1910	\$173,344,650	\$124,235,803	\$22,795,126	\$26,313,721	71.7	13.1	15.2
Value of products.....	1919							
New York:								
Number of establishments.....	1919	30	13	5	12	43.3	16.7	40.0
	1910	\$100,592,636	\$78,050,822	\$10,411,562	\$12,121,252	77.6	10.4	12.0
All other states:								
Number of establishments.....	1919	154	42	46	66	27.3	29.9	42.8
	1914	170	40	55	84	22.4	30.7	46.9
	1909	182	32	53	97	17.6	29.1	53.3
Value of products.....	1919	\$632,182,995	\$389,285,540	\$47,311,098	\$105,606,357	61.6	7.5	30.9
	1914	265,634,850	160,611,447	23,170,355	81,753,038	60.5	8.7	30.8
	1909	287,598,490	177,143,990	19,972,330	90,482,158	61.6	8.9	31.5

TABLE 36.—PRINCIPAL STATES, RANKED BY VALUE OF PRODUCTS: 1919.

STATE.	Number of establish- ments.	WAGE EARNERS.			VALUE OF PRODUCTS.			VALUE ADDED BY MANUFACTURE.		
		Average number.	Per cent distribution.	Rank.	Amount (expressed in thousands).	Per cent distribution.	Rank.	Amount (expressed in thousands).	Per cent distribution.	Rank.
United States.....	500	375,088	100.0	.....	\$2,828,002	100.0	.....	\$1,148,327	100.0	.....
Pennsylvania.....	108	171,715	45.8	1	1,296,412	45.8	1	518,939	45.2	1
Ohio.....	88	73,095	19.5	2	626,370	22.1	2	245,810	21.4	2
Indiana.....	23	22,382	5.9	3	189,273	7.1	3	86,079	7.5	3
Illinois.....	32	20,177	5.4	4	173,346	6.1	4	73,025	6.3	4
New York.....	30	17,901	4.8	5	100,593	3.6	5	45,776	4.0	5
West Virginia.....	20	11,630	3.1	7	85,036	3.0	6	34,242	3.0	7
New Jersey.....	16	13,811	3.7	6	74,382	2.6	7	40,055	3.5	6
Alabama.....	9	8,121	2.2	8	64,980	2.3	8	15,646	1.4	8
Massachusetts.....	11	8,084	1.0	11	30,970	1.1	9	11,733	1.0	10
Wisconsin.....	12	3,920	1.0	10	28,393	1.0	10	14,047	1.2	9
Maryland.....	5	4,044	1.3	9	10,884	0.7	11	4,804	0.4	17
Kentucky.....	5	1,802	0.5	16	18,319	0.7	12	5,605	0.5	14
California.....	8	3,476	0.9	12	18,192	0.6	13	8,683	0.7	11
Missouri.....	5	2,647	0.7	14	12,537	0.4	15	6,876	0.6	12
Connecticut.....	7	2,408	0.6	15	9,583	0.3	17	5,341	0.5	16
Michigan.....	7	1,455	0.4	17	8,345	0.3	18	5,443	0.5	15
Delaware.....	3	1,009	0.3	21	7,115	0.3	19	3,258	0.3	19
All other states.....	20	10,842	2.9	.....	55,173	2.0	.....	23,410	2.0	.....

## MANUFACTURES.

TABLE 37.—PERSONS ENGAGED IN THE INDUSTRY: 1919, 1914, AND 1909.

CLASS.	Cen-sus year.	Total.	Male.	Fe-male.	PER CENT OF TOTAL.		CLASS.	Cen-sus year.	Total.	Male.	Fe-male.	PER CENT OF TOTAL.	
					Male.	Fe-male.						Male.	Fe-male.
All classes .....	1919	421,861	409,581	12,280	97.1	2.9	Clerks and other subordinate salaried employees.	1910	37,067	28,304	8,763	76.4	23.6
	1914	274,162	270,720	3,442	98.7	1.3		1914	20,919	18,496	2,453	88.3	11.7
	1909	260,762	257,962	2,800	98.9	1.1		1909	16,400	14,613	1,787	89.1	10.9
Proprietors and officials .....	1919	9,706	9,673	33	99.7	0.3	Wage earners (average number) ..	1910	375,088	371,604	3,484	99.1	0.9
	1914	4,527	4,517	10	99.8	0.2		1914	248,716	247,737	979	98.6	0.4
	1909	4,286	4,278	8	99.8	0.2	16 years of age and over .....	1919	374,016	371,444	3,472	99.1	0.9
Proprietors and firm members .....	1919	35	29	6	82.9	17.1		1914	247,991	247,048	943	99.6	0.4
	1914	52	45	7	86.5	13.5		1909	238,937	237,996	941	99.6	0.4
	1909	47	43	4	91.5	8.5	Under 16 years of age .....	1919	172	160	12	93.6	6.4
Salaried officers of corporations .....	1919	1,160	1,145	5	99.6	0.4		1914	725	689	36	95.0	5.0
	1914	766	764	2	99.7	0.3		1909	1,139	1,075	64	94.4	5.6
Superintendents and managers .....	1919	8,521	8,498	22	99.7	0.3							
	1914	3,709	3,708	1	100.0	(1)							
	1909	3,400	3,456	4	99.9	0.1							

<sup>1</sup> Less than one-tenth of 1 per cent.

TABLE 38.—WAGE EARNERS, BY MONTHS, FOR STATES: 1919.

[The month of maximum employment is indicated by bold-faced figures and that of minimum employment by *italic* figures.]

STATE.	Aver-age num-ber em-ployed during year.	NUMBER EMPLOYED ON 15TH DAY OF THE MONTH OR NEAREST REPRESENTATIVE DAY.												Per cent minimum is of maximum.
		Janu-ary.	Februa-ry.	March.	April.	May.	June.	July.	August.	Septem-ber.	Octo-ber.	Novem-ber.	Decem-ber.	
United States:														
1919.....	375,088	441,560	416,541	392,903	387,514	354,721	360,584	383,212	387,965	377,275	298,409	343,312	383,100	66.2
Males.....	371,604	437,472	412,696	389,192	364,164	351,398	357,280	379,815	384,516	373,960	289,468	339,822	379,469	66.2
Females.....	3,484	4,088	3,845	3,611	3,350	3,328	3,298	3,397	3,449	3,315	9,011	3,400	3,631	73.7
1914.....	248,716	257,651	262,418	271,531	270,941	254,443	254,827	252,680	247,953	249,035	283,338	210,279	218,896	77.4
1909.....	240,076	216,349	215,650	210,076	217,307	218,424	225,533	234,151	242,077	258,925	260,255	274,525	283,829	75.8
Alabama.....	8,121	8,695	8,400	8,249	8,555	8,021	7,780	8,087	8,144	7,845	7,745	8,052	8,059	89.8
California.....	3,476	3,586	3,450	3,430	3,317	3,489	3,300	3,376	3,533	3,481	3,746	3,545	3,562	88.3
Connecticut.....	2,408	2,824	2,683	2,555	2,403	2,187	2,265	2,182	2,381	2,503	2,708	2,503	2,712	77.3
Delaware.....	1,000	1,746	1,478	1,025	725	768	684	834	835	975	1,075	903	1,090	32.3
Illinois.....	20,177	25,039	25,795	23,613	21,561	20,059	18,510	18,669	19,452	20,302	18,330	18,274	17,520	51.7
Indiana.....	22,362	28,083	24,303	28,943	21,461	21,195	21,891	23,284	22,022	22,020	16,689	21,987	23,403	64.0
Kentucky.....	1,802	2,633	2,539	2,335	2,040	2,100	2,099	1,332	863	862	1,038	2,171	2,662	32.4
Maryland.....	4,944	5,581	5,725	5,253	4,283	4,021	4,238	4,786	4,813	4,893	5,225	5,266	5,243	70.2
Massachusetts.....	3,684	3,825	3,599	3,385	3,281	3,390	3,407	3,673	3,786	3,940	3,991	3,962	4,029	70.9
Michigan.....	1,455	1,628	1,578	1,342	1,305	1,110	1,214	1,467	1,494	1,526	1,649	1,675	1,472	66.3
Missouri.....	2,647	3,250	3,253	3,213	2,531	2,459	2,447	2,227	2,605	2,581	2,536	2,176	2,486	66.9
New Jersey.....	13,811	14,473	14,316	14,153	13,645	13,492	13,558	13,351	13,427	13,638	13,888	13,884	13,807	92.3
New York.....	17,901	22,502	18,291	17,897	17,722	16,710	17,217	18,291	18,606	18,499	18,891	16,287	19,309	59.5
Ohio.....	73,025	85,394	80,123	75,342	69,910	70,438	72,505	80,007	81,135	80,241	41,747	60,712	78,745	48.9
Pennsylvania.....	171,715	202,630	190,815	177,543	166,937	159,332	163,373	174,004	176,471	169,885	145,252	160,270	174,088	71.7
West Virginia.....	11,630	12,794	12,824	12,603	12,549	11,043	11,579	12,084	12,571	13,210	7,020	8,834	11,199	68.0
Wisconsin.....	3,929	4,794	4,274	4,286	3,684	3,387	3,391	3,590	3,704	3,797	3,541	4,308	4,448	70.7

# STEEL WORKS AND ROLLING MILLS.

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**TABLE 39.—AVERAGE NUMBER OF WAGE EARNERS, BY PREVAILING HOURS OF LABOR PER WEEK, FOR SELECTED STATES: 1919, 1914, AND 1909.**

STATE.	Total.	IN ESTABLISHMENTS WHERE THE PREVAILING HOURS OF LABOR PER WEEK WERE—							STATE.	Total.	IN ESTABLISHMENTS WHERE THE PREVAILING HOURS OF LABOR PER WEEK WERE—							
		44 and under.	Between 44 and 48.	Between 48 and 54.	54.	Between 54 and 60.	60.	Over 60.			44 and under.	Between 44 and 48.	48.	Between 48 and 54.	54.	Between 54 and 60.	60.	Over 60.
		(2)	(2)	(2)	(2)	(2)	(2)	(2)			(2)	(2)	(2)	(2)	(2)	(2)	(2)	
United States:	375,088	56,099	8,522	51,552	12,218	13,704	71,876	82,232	75,825	Michigan:	1,455	.....	.....	364	325	684	82	.....
1919.....	375,088	56,099	8,522	51,552	12,218	13,704	71,876	82,232	75,825	1919.....	1,455	.....	.....	364	325	684	82	.....
1914.....	248,716	.....	.....	10,072	19,084	25,565	45,906	77,820	60,279	1914.....	718	.....	.....	121	79	457	61	.....
1909.....	240,076	.....	.....	18,283	4,094	23,982	29,022	82,130	82,565	Missouri:	2,647	.....	.....	1,319	655	673	639	.....
Alabama:	8,121	.....	.....	.....	203	1,542	4,091	2,285	.....	.....	.....	.....	.....	.....	.....	.....	.....	
California:	3,470	820	.....	1,223	.....	450	977	.....	.....	New Jersey:	13,811	.....	.....	962	3,329	9,380	81	59
1919.....	3,470	820	.....	1,223	.....	450	977	.....	.....	1914.....	4,639	.....	.....	1,842	579	1,067	1,151	.....
1914.....	1,244	(2)	(2)	435	178	444	4	183	.....	New York:	17,901	701	647	192	331	2,201	3,845	4,094
Connecticut:	2,468	.....	.....	1,300	130	61	917	.....	.....	1919.....	10,788	.....	.....	173	1,796	2,843	5,976	.....
1919.....	2,468	.....	.....	337	242	239	.....	.....	.....	1914.....	.....	.....	.....	.....	.....	.....	.....	.....
Delaware:	1,000	.....	.....	295	.....	270	.....	444	.....	Ohio:	73,025	8,313	.....	8,058	1,204	567	16,690	24,170
1919.....	818	(2)	(2)	337	242	239	.....	.....	.....	1914.....	46,397	(2)	(2)	3,303	2,013	2,981	8,094	20,551
1914.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Pennsylvania:	171,715	30,427	6,978	25,290	5,256	3,207	29,628	39,429
Illinois:	20,177	501	401	5,359	678	478	2,730	798	9,329	1919.....	131,955	(2)	(2)	5,321	11,902	14,515	26,948	34,721
1919.....	20,177	501	401	5,359	678	478	2,730	798	9,329	1914.....	.....	.....	.....	.....	.....	.....	.....	.....
1914.....	15,408	(2)	(2)	1,469	2,003	639	94	2,656	8,547	West Virginia:	11,630	4,997	.....	2,276	1,269	.....	240	1,539
Indiana:	22,362	4,055	.....	4,085	641	161	1,234	3,141	8,445	1919.....	5,348	(2)	(2)	2,123	51	962	740	535
1919.....	22,362	4,055	.....	4,085	641	161	1,234	3,141	8,445	1914.....	.....	.....	.....	.....	.....	.....	.....	.....
1914.....	11,100	(2)	(2)	2,900	151	1,082	1,584	4,509	.....	Wisconsin:	3,920	.....	72	.....	433	150	2,253	1,021
Kentucky:	1,892	.....	.....	603	.....	196	603	260	230	1919.....	2,029	(2)	(2)	89	171	32	925	812
1919.....	1,892	.....	.....	1,136	.....	158	301	392	.....	1914.....	.....	.....	.....	.....	.....	.....	.....	.....
Maryland:	4,914	3,896	31	.....	.....	283	731	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Massachusetts:	3,084	9	417	340	36	89	417	2,370	.....	.....	.....	.....	.....	.....	.....	.....	.....	
1919.....	3,084	9	417	340	36	89	417	2,370	.....	.....	.....	.....	.....	.....	.....	.....	.....	
1914.....	2,880	(2)	(2)	15	55	257	303	2,194	.....	.....	.....	.....	.....	.....	.....	.....	.....	

<sup>1</sup> Includes 48 and under for 1914 and 1909.

<sup>2</sup> Corresponding figures not available.

**TABLE 40.—SIZE OF ESTABLISHMENTS, BY AVERAGE NUMBER OF WAGE EARNERS FOR STATES: 1919.**

STATE.	TOTAL.		ESTABLISHMENTS EMPLOYING—															
	Estab- lish- ments.	Wage earners (average number).	1 to 5 wage earners, inclusive.		6 to 20 wage earners, inclusive.		21 to 50 wage earners, inclusive.		51 to 100 wage earners, inclusive.		101 to 250 wage earners, inclusive.		251 to 500 wage earners, inclusive.		501 to 1,000 wage earners, inclusive.		Over 1,000 wage earners.	
			Estab- lish- ments.	Wage earners.	Estab- lish- ments.	Wage earners.	Estab- lish- ments.	Wage earners.	Estab- lish- ments.	Wage earners.	Estab- lish- ments.	Wage earners.	Estab- lish- ments.	Wage earners.	Estab- lish- ments.	Wage earners.		
United States:	500	375,088	5	20	13	170	32	1,133	48	3,666	97	16,763	103	38,269	102	72,797	100	
1919.....	500	375,088	5	20	13	170	30	1,119	46	3,629	92	15,414	94	33,921	87	61,185	59	
1914.....	427	248,716	3	8	16	196	30	.....	.....	.....	.....	.....	.....	.....	.....	.....	133,244	
Alabama.....	9	8,121	.....	.....	.....	.....	1	40	.....	.....	3	494	2	750	1	982	3	
California.....	8	3,470	.....	.....	.....	.....	2	68	2	147	1	196	3	1,214	3	2,026	1	
Connecticut.....	7	2,468	.....	.....	.....	.....	1	40	1	80	3	123	1	393	1	1,287	1	
Delaware.....	6	1,009	.....	.....	.....	.....	1	36	3	272	9	1,641	8	3,085	5	3,439	5	
Illinois.....	32	20,177	.....	1	14	1	36	3	272	9	1,641	8	1,255	7	5,093	5	11,690	14,794
Indiana.....	23	22,362	.....	.....	.....	.....	1	38	1	83	2	1,137	1	2,426	1	2,260	1	
Kentucky.....	5	1,892	.....	.....	.....	.....	1	34	1	85	2	426	1	283	1	646	1	
Maryland.....	5	4,944	.....	.....	3	29	2	69	1	89	2	417	2	704	1	2,378	1	
Massachusetts.....	11	3,084	.....	.....	3	29	2	69	1	89	2	364	3	971	2	2,140	2	
Michigan.....	7	1,455	.....	.....	.....	.....	1	38	1	82	2	132	1	375	3	2,140	10,140	
Missouri.....	5	2,047	.....	.....	.....	.....	1	30	4	316	1	182	3	943	4	2,200	7	
New Jersey.....	16	18,811	.....	.....	1	15	2	77	5	400	7	1,394	5	1,999	3	2,017	11,999	
New York.....	30	17,901	.....	.....	.....	.....	1	39	2	73	4	683	1	251	2	1,617	1	
Ohio.....	86	73,025	1	1	2	30	4	167	3	196	14	2,480	17	6,125	27	20,075	18	
Pennsylvania.....	108	171,715	4	10	4	60	11	345	19	1,351	31	5,073	46	17,671	35	24,670	48	
West Virginia.....	20	11,630	.....	.....	.....	.....	1	39	2	155	4	675	5	1,616	5	3,748	3	
Wisconsin.....	12	3,029	.....	.....	.....	.....	3	117	1	73	4	683	1	251	2	1,617	1	

## MANUFACTURES.

TABLE 41.—SIZE OF ESTABLISHMENTS, BY VALUE OF PRODUCTS: 1919, 1914, AND 1909.

VALUE OF PRODUCT: ALL CLASSES	NUMBER OF ESTABLISHMENTS.			AVERAGE NUMBER OF WAGE EARNERS. <sup>1</sup>		VALUE OF PRODUCTS.			VALUE ADDED BY MANUFACTURE, <sup>1</sup>	
	1919	1914	1909	1919	1914	1919	1914	1909	1919	1914
All classes	500	427	446	375,088	248,716	\$2,828,902,376	\$918,664,565	\$985,722,534	\$1,148,326,618	\$327,838,873
Less than \$20,000	7	9	15	40	58	82,829	79,697	195,454	30,962	37,827
\$20,000 to \$100,000	15	34	44	288	1,227	964,125	1,808,617	2,643,474	460,464	972,646
\$100,000 to \$500,000	83	131	{ 201 }	6,289	{ 30,352 }	25,599,733	38,923,246	80,119,207	{ 12,879,881 }	{ 38,099,401 }
\$500,000 to \$1,000,000	65	63	{ 11,092 }	47,864,830	{ 45,953,978 }	2,754,300,850	831,809,027	808,764,339	23,723,404	288,728,999
\$1,000,000 and over	330	190	186	357,379	208,079				1,111,231,907	
PER CENT DISTRIBUTION.										
All classes	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Less than \$20,000	1.4	2.1	3.3	(*)	(*)	(*)	(*)	(*)	(*)	(*)
\$20,000 to \$100,000	3.0	8.0	9.9	0.1	0.5	(*)	0.2	0.3	(*)	0.3
\$100,000 to \$500,000	16.6	30.6	{ 45.1 }	1.7	15.8	{ 0.9 }	4.2	8.7	{ 1.1 }	11.6
\$500,000 to \$1,000,000	13.0	14.8	{ 3.0 }	3.0	97.4	5.0	90.5	91.0	2.1	88.1
\$1,000,000 and over	66.0	44.5	41.7	95.2	83.7				96.8	

<sup>1</sup> Figures for 1909 not available.<sup>2</sup> Less than one-tenth of 1 per cent.

TABLE 42.—CHARACTER OF OWNERSHIP: 1919, 1914, AND 1909.

Cen-	Cen-	Total.	Corporations.	All others. <sup>1</sup>	PER CENT OF TOTAL.		Cen-	Cen-	Total.	Corporations.	All others.	PER CENT OF TOTAL.	
					Cor-	All						Cor-	All
					por-	oth-						por-	All
Number of establish-	1919	500	481	19	96.2	3.8	Value of products....	1919	\$2,828,902,376	\$2,820,937,996	\$7,964,380	99.7	0.3
ments.	1914	427	407	20	95.8	4.7		1914	918,664,565	4,464,927	99.5	0.5	
	1909	446	424	22	95.1	4.9		1909	985,722,534	5,175,917	99.5	0.5	
Average number of	1919	375,088	373,442	1,646	99.6	0.4							
wage earners.	1914	248,716	246,020	2,696	98.9	1.1							
	1909	240,076	237,684	2,392	99.0	1.0							

<sup>1</sup> Includes 10 establishments owned by individuals in 1919 and 8 each in 1914 and in 1909; balance chiefly firms.

TABLE 43.—NUMBER AND HORSEPOWER OF TYPES OF PRIME MOVERS: 1919, 1914, AND 1909.

POWER.		NUMBER OF ENGINES OR MOTORS.			HORSEPOWER.					
		1919	1914	1909	Amount.			Per cent distribution.		
					1919	1914	1909	1919	1914	1909
Primary power, total		27,645	11,227	8,244	3,820,917	2,706,553	2,100,978	100.0	100.0	100.0
Owned		5,592	5,328	6,033	3,123,070	2,521,392	2,042,066	81.7	93.2	97.2
Steam		5,418	5,121	5,865	2,856,558	2,435,319	1,956,846	74.7	0.0	93.1
Engines		4,739	2,5,121	2,5,865	2,245,816	2,435,319	1,956,846	58.7	90.0	93.1
Turbines		679			610,710			16.0		
Internal-combustion engines		141	128	118	257,473	73,752	79,391	6.8	2.7	3.8
Water wheels, turbines and motors		33	84	60	9,041	12,321	5,820	0.2	0.5	0.3
Rented		22,053	5,899	2,211	697,847	185,161	58,912	18.2	6.8	2.8
Electric		22,053	5,899	2,211	695,097	182,204	58,797	18.2	6.7	2.8
Other					2,750	2,957	115	(*)	0.1	(*)
Electric		85,480	45,896	27,789	2,360,506	1,207,715	716,609	100.0	100.0	100.0
Rented		22,053	5,899	2,211	695,097	182,204	58,797	29.6	15.1	8.2
Generated by establishments reporting		63,427	39,997	25,558	1,655,499	1,026,511	657,812	70.4	84.9	91.8

<sup>1</sup> Figures for horsepower include for 1909 the amount reported under the head of "Other" owned power. <sup>2</sup> Includes turbines. <sup>3</sup> Less than one-tenth of 1 per cent.

TABLE 44.—FUEL CONSUMED, BY STATES: 1919 AND 1914.

STATE.	COAL.		Coke (tons, 2,000 pounds).	Fuel oils (barrels).	Gaso- line and other volatile oils (bar- rels).	Gas (1,000 cu- bic feet).	STATE.	COAL.		Coke (tons, 2,000 pounds).	Fuel oils (barrels).	Gaso- line and other volatile oils (bar- rels).	Gas (1,000 cu- bic feet).	
	Anthra- cite <sup>1</sup> (tons, 2,240 pounds).	Bitumi- nous (tons, 2,000 pounds).						Anthra- cite <sup>1</sup> (tons, 2,240 pounds).	Bitumi- nous (tons, 2,000 pounds).					
United States:														
1919.....	508,944	25,911,008	886,062	8,191,143	299,840	90,678,288	Michigan:							
1914.....	558,723	20,343,767	495,214	3,011,102	(2)	81,310,122	1919.....	30,481	6,038	32,208	1,005	1,022		
Alabama:							1914.....	22,173	2,036	23,404	(2)	4,505		
1919.....	77	907,485	85,477	81,294	.....	174,500	Missouri:							
California:							1919.....	76,980	2,651	138,348	.....	528		
1919.....							1914.....	48,135	1,836	95,976	(2)	.....		
Connecticut:							New Jersey:							
1919.....	43,544	67,281	11,244	12,115	147	2,020	1919.....	35,634	392,985	3,857	430,771	203	1,800	
Delaware:							1914.....	39,031	234,186	3,373	183,580	(2)	2,173	
1919.....	538	104,389	3,194	15,454	217	1	New York:							
1914.....	2,734	20,047	8,125	2,941	(2)	29	1919.....	4,398	1,074,618	34,876	149,178	4,731	86,481	
Illinois:							1914.....	6,808	790,937	28,703	78,570	(2)	31,471	
1919.....	1,103	1,792,476	33,325	575,473	30,450	452,948	Ohio:							
1914.....	583	1,670,382	40,908	848,078	(2)	962	1919.....	1,175	5,096,601	284,874	565,975	9,854	15,294,674	
Indiana:							1914.....	574	4,209,990	134,533	132,124	(2)	12,067,011	
1919.....	475	1,753,160	17,608	787,265	921	28,634	Pennsylvania:							
1914.....	4	1,211,399	13,054	162,716	(2)	32,778	1919.....	509,568	12,571,538	319,198	3,674,868	181,394	68,025,366	
Kentucky:							1914.....	470,646	10,335,061	162,924	1,006,888	(2)	63,406,100	
1919.....							West Virginia:							
1914.....							1919.....							
Maryland:							1914.....							
1919.....	157	107,625	3,713	529,811	250	835,590	Wisconsin:							
Massachusetts:							1919.....							
1919.....	1,342	142,309	1,226	278,441	366	107,817	1914.....							
1914.....	722	125,184	1,068	65,648	(2)	7,430	All other States:							
							1919.....							
							1914.....							

<sup>1</sup>Includes some semianthracite.<sup>2</sup> Included in figures for fuel oils.

## SPECIAL STATISTICS.

**Materials.**—Table 45 gives the statistics for the principal materials used in the industry for the census years 1919, 1914, 1909, and 1904, distributed in the main as between those produced by the consuming establishment and purchased materials. The former carry assigned values. The cost of all rolled forms not specifically listed is included in the item "All other materials." Detailed statistics, by states, will be found in Table 65.

The figures in Table 45 show an increase of 39.8 per cent in pig-iron consumption for the period 1914–1919, with a decrease of 8.6 per cent for the period 1909–1914 and an increase of 56.4 per cent for 1904–1909.

The expense for fuel and rent of power constituted 9.3 per cent of the total cost for materials in 1919 and 1914.

## MANUFACTURES.

TABLE 45.—MATERIALS: 1919, 1914, 1909, AND 1904.  
[Ton, 2,240 pounds.]

MATERIAL.	1919	1914	1909	1904
Total cost.....	\$1,680,575,758	\$590,825,692	\$657,500,858	\$441,204,432
Iron and steel, for furnaces and hot rolls—				
Pig iron, including ferroalloys—				
Tons.....	24,362,942	17,420,657	19,076,889	12,191,228
Cost.....	\$655,002,125	\$248,630,958	\$207,471,122	\$172,101,436
Pig iron—				
Produced by consumer—				
Tons.....	21,170,136	15,111,458	15,108,244	(1)
Assigned cost.....	\$490,318,109	\$201,965,395	\$224,474,026	(1)
Purchased—				
Tons.....	2,749,822	2,016,634	3,604,060	(1)
Cost.....	\$85,204,226	\$30,166,877	\$58,189,714	(1)
Spiegeleisen and ferromanganese—				
Produced by consumer—				
Tons.....	123,353	103,238	144,492	(1)
Cost.....	\$13,772,841	\$8,849,738	\$8,776,798	(1)
Purchased—				
Tons.....	223,742	193,327	220,083	(1)
Cost.....	\$27,706,500	\$12,649,448	\$11,030,584	(1)
Other ferroalloys—				
Produced by consumer—				
Tons.....	7,215	(2)	(2)	(1)
Cost.....	\$1,292,522	(2)	(2)	(1)
Purchased—				
Tons.....	88,674	(2)	(2)	(1)
Cost.....	\$30,712,537	(2)	(2)	(2)
Scrap iron or steel, including old rails not intended for rerolling—				
Total consumption, tons.....	16,369,210	10,656,187	9,929,710	(1)
Produced by consumer in other works—				
Tons.....	1,480,260	890,113	773,843	(1)
Assigned cost.....	\$28,154,391	\$11,384,960	\$10,629,317	5,124,277
Purchased—				
Tons.....	5,545,822	4,171,767	4,029,774	\$67,601,248
Cost.....	\$116,978,600	\$47,696,567	\$62,093,514	
Made and consumed in same works, tons.....	9,343,128	5,585,307	5,126,098	(1)
Rails for rerolling—				
Tons.....	165,459	(3)	(3)	(3)
Cost.....	\$4,154,381	(3)	(3)	(3)
Steel, crude and semifinished (Ingots, blooms, billets, slabs, and sheet and thin-plate bars)—				
Produced by consumer in other works—				
Tons.....	4,401,127	2,882,069	3,080,672	(1)
Assigned cost.....	\$173,067,624	\$57,587,159	\$62,594,558	4,920,177
Purchased—				
Tons.....	4,545,100	3,576,330	3,427,577	\$110,268,828
Cost.....	\$194,994,191	\$74,590,904	\$82,981,077	
Iron ore—				
Tons.....	1,051,791	999,472	885,338	549,995
Domestic.....	1,044,907	989,617	823,306	546,282
Foreign.....	6,884	29,855	12,032	3,733
Cost.....	\$8,480,622	\$4,282,201	\$4,292,963	\$2,390,792
Crude—				
Tons.....	1,014,080	(1)	(1)	(1)
Cost.....	\$7,185,658			
Manganiferous—				
Tons.....	17,709	(1)	(1)	(1)
Cost.....	\$234,619			
Chrome—				
Tons.....	19,093	(1)	(1)	(1)
Cost.....	\$1,060,345			
Iron and steel, rolled forms for further manufacture—				
Iron muck and scrap bar—				
Total consumption, tons.....	968,512	(1)	(1)	(1)
Produced by consumer in other works—				
Tons.....	108,800	(3)	(3)	(3)
Assigned cost.....	\$6,589,465	(3)	(3)	(3)
Purchased—				
Tons.....	128,203	(3)	(3)	(1)
Cost.....	\$7,586,489	(3)	(3)	(1)
Made and consumed in same works, tons.....	783,509	(1)	(1)	(1)
Iron and steel skelp—				
Total consumption, tons.....	2,425,845	1,376,813	1,578,200	(1)
Produced by consumer in other works—				
Tons.....	322,082	47,908	35,221	(1)
Assigned cost.....	\$19,297,117	\$1,662,917	\$1,151,430	259,643
Purchased—				
Tons.....	437,764	144,559	141,406	\$7,331,956
Cost.....	\$27,314,278	\$3,833,933	\$4,553,426	
Made and consumed in same works, tons.....	1,665,998	1,183,756	1,401,573	(1)
Iron and steel wire rods—				
Total consumption, tons.....	1,375,949	1,494,761	1,465,221	(1)
Produced by consumer in other works—				
Tons.....	5,704	76,717	128,291	(1)
Assigned cost.....	\$620,597	\$1,864,312	\$3,547,577	161,914
Purchased—				
Tons.....	15,528	18,078	18,134	\$4,774,383
Cost.....	\$1,327,725	\$487,715	\$705,118	
Made and consumed in same works, tons.....	1,354,627	1,399,066	1,318,796	(1)

<sup>1</sup> Figures not available.<sup>2</sup> Included with spiegeleisen and ferromanganese.<sup>3</sup> Included with steel, crude and semifinished, etc.

TABLE 45.—MATERIALS: 1919, 1914, 1909, AND 1904—Continued.

MATERIAL.	1919	1914	1909	1904
Iron and steel, rolled forms for further manufacture—Con. Copper ingots, billets, blooms, bars, and rods—				
Total consumption, tons....	72,366			
Produced by consumer in other works—				
Tons.....	12,040			
Assigned cost.....	\$402,305			
Purchased—				
Tons.....	31,318			
Cost.....	\$12,980,464			
Made and consumed in same works, tons....	29,008			
Copper scrap—				
Tons.....	1,714			
Cost.....	\$524,252			
Zinc (spelter)—				
Tons.....	80,380			
Cost.....	\$12,283,008			
Fuel and rent of power, cost....	\$156,964,802	\$65,447,804	\$46,136,725	\$35,386,666
All other materials, cost.....	\$253,852,002	\$70,016,953	\$75,588,011	\$41,343,144

<sup>1</sup> Figures not available.<sup>2</sup> Included with "All other materials."

**Pig-iron consumption.**—Table 46 presents the figures for the consumption of pig iron and ferroalloys in 1919, 1914, and 1909, and the figures for Ohio and Pennsylvania, the leading states, these states consuming more than two-thirds of the total.

TABLE 46.—PIG IRON AND FERROALLOYS—CONSUMPTION: 1919, 1914, AND 1909.

[Ton, 2,240 pounds.]

	Cen-	Total,	Pro-	PER CENT OF	
				sus-	Produced
year.	year.	by com-	Pur-	of	TOTAL.
United States:					
Total.....	1919	24,362,942	21,300,704	3,062,238	87.4 12.6
	1914	17,423,657	15,219,696	2,209,961	87.3 12.7
	1909	19,076,889	15,257,736	3,824,153	80.0 20.0
Pig iron.....	1919	23,919,958	21,170,136	2,740,822	88.5 11.5
	1914	17,128,092	15,111,458	2,016,634	88.2 11.8
	1909	18,712,304	15,108,244	3,604,060	80.7 19.3
Ferroalloys (spiegeleisen, ferromanganese, etc.)	1919	442,984	130,568	312,416	29.5 70.5
	1914	301,565	103,238	197,327	35.0 64.1
	1909	364,585	144,492	220,093	39.6 60.4
Ohio:					
Pig iron.....	1919	5,784,072	5,171,519	612,553	89.4 10.6
	1914	4,341,857	3,651,843	300,014	91.0 9.0
	1909	4,172,114	3,172,453	99,661	78.0 24.0
Ferroalloys.....	1910	100,927	18,904	81,963	18.8 81.2
	1914	46,160	10,306	35,860	22.3 77.7
	1909	37,035	10,402	27,573	28.2 71.8
Pennsylvania:					
Pig iron.....	1919	10,325,070	9,136,962	1,188,108	88.5 11.5
	1914	8,262,049	7,230,146	1,031,903	87.5 12.5
	1909	9,153,260	7,197,182	1,001,078	78.6 21.4
Ferroalloys.....	1919	200,731	70,705	130,026	35.2 64.8
	1914	138,132	46,560	91,572	33.7 66.3
	1909	159,043	77,719	81,924	48.7 51.3
All other states:					
Pig iron.....	1919	7,810,816	6,801,655	949,161	87.8 12.2
	1914	4,524,186	3,920,409	504,717	86.9 13.1
	1909	5,381,930	4,738,009	643,321	88.0 12.0
Ferroalloys.....	1919	141,320	40,899	100,427	28.9 71.1
	1914	117,267	51,372	65,895	43.8 56.2
	1909	167,907	56,311	111,596	33.5 66.5

**Products.**—Table 47 is a comparative summary of the leading classes of products for the census years 1904 to 1919, inclusive. The table carries data for the number of establishments reporting quantities and values for each class, with the quantity and value of each produced for sale, and the quantity and assigned value for products made for consumption by the same establishment in further processes of manufacture. This information is given with as much detail as the records permit.

For convenience the products are divided into four groups, namely: Group I, rolled, forged, and other classified steel and iron products, with subdivisions (A) for finished rolled products and forgings; (B) semi-finished rolled products; and (C) unrolled steel. The other groups of the table comprise Group II, scrap; Group III, other iron and steel products; and Group IV, products other than iron and steel. The aggregate value of the products of these four groups, which represents the total products of the establishments constituting the industry, was \$2,828,902,376 in 1919, an increase of \$1,910,237,811, or over 200 per cent, over that of 1914. Group III carries the added value accruing from remanufactures from rolled products, such as pipes and tubes, wire and wire products, spikes, bolts, rivets, etc., detailed statistics of which are given in Table 53, including the total value of these products.

TABLE 47.—PRODUCTS: 1919, 1914, 1909, AND 1904.

[Ton, 2,210 pounds.]

PRODUCT.	1919	1914	1909	1904
Total value <sup>1</sup> .....	\$2,828,002,376	\$918,604,505	\$985,722,534	\$673,965,026
I. Rolled, forged, and other classified steel and iron products:				
Tons.....	36,211,047	25,522,784	26,723,274	18,218,233
For sale.....	23,114,711	16,904,066	18,205,801	—
For consumption.....	13,097,236	8,617,818	8,457,383	—
Value.....	\$2,417,012,546	\$800,278,038	\$803,342,711	\$585,288,243
A.—Finished rolled products and forgings—				
Tons.....	25,512,847	18,482,182	19,276,237	12,759,093
For sale.....	17,343,747	12,047,038	14,024,550	—
For consumption.....	8,169,100	5,834,544	5,251,087	—
Value.....	\$1,859,457,051	\$223,485,903	\$807,393,177	\$147,150,695
Rails—				
Number of establishments.....	18	15	13	14
Tons.....	32,058,828	1,842,041	2,858,500	2,194,605
Value.....	\$92,849,481	\$54,009,018	\$31,128,295	\$58,256,750
Open-hearth—				
Tons.....	1,803,141	1,552,684	1,215,072	128,681
Value.....	\$82,044,840	\$16,330,381	\$36,400,780	\$3,008,582
Bessemer—				
Tons.....	195,697	310,357	1,643,527	2,065,024
Value.....	\$10,204,835	\$8,673,537	\$14,727,515	\$54,627,488
Rerolled or renewed rails—				
Number of establishments.....	6	8	9	8
Tons.....	95,037	63,671	106,352	99,530
Value.....	\$4,738,883	\$1,438,237	\$2,683,017	\$2,480,328
Rail joints, fastenings, etc.—				
Number of establishments.....	24	26	25	—
Tons.....	462,091	340,307	396,011	174,055
Value.....	\$27,595,921	\$11,626,056	\$14,488,412	\$5,603,052
Structural shapes—				
Number of establishments.....	30	35	37	—
Tons.....	2,526,491	2,083,440	2,123,030	954,537
Value.....	\$151,970,064	\$57,475,306	\$35,564,503	\$32,730,901
Bars for reinforced concrete—				
Number of establishments.....	34	30	25	—
Tons.....	301,453	209,068	191,358	—
Value.....	\$18,423,705	\$7,751,549	\$5,588,903	—
Merchant bars, mill shafting, etc.—				
Number of establishments.....	140	99	—	—
Steel—				
Tons.....	4,020,448	2,082,701	—	—
Value.....	\$320,704,260	\$71,352,396	—	—
Iron—				
Tons.....	458,549	411,946	132	—
Value.....	\$33,796,197	\$13,057,101	\$121,488,423	—
Bolt and nut rods, spike and chain rods, horseshoe nail rods, etc.—				
Number of establishments.....	20	41	—	—
Tons.....	232,920	535,875	—	—
Value.....	\$15,333,748	\$18,319,865	—	—

<sup>1</sup> In addition, steel castings and rolled steel valued at \$7,143,128 were produced by 7 establishments in 1919; to the value of \$2,831,004 by 13 establishments in 1914; to the value of \$6,627,639 by 29 establishments in 1909; and to the value of \$347,204 in 1904 by establishments not classified as steel works and rolling mills.

<sup>2</sup> Includes 77,698 tons of alloy steel rails in 1919, and 27,286 tons in 1914.

TABLE 47.—PRODUCTS: 1919, 1914, 1909, AND 1904—Continued.

PRODUCT.	1919	1914	1909	1904
I. Rolled, forged, and other classified steel and iron products—Continued.				
A.—Finished rolled products and forgings—Con.				
Wire rods—				
Number of establishments.....	33	33	29	—
Tons.....	2,484,428	2,377,691	2,295,279	1,792,704
Value.....	\$126,738,142	\$81,578,145	\$61,947,938	\$52,995,031
For sale—				
Tons.....	582,273	535,098	511,322	(*)
Value.....	\$31,152,583	\$14,000,752	\$14,681,108	—
For consumption, tons.				
In works where produced.....	1,902,155	1,842,593	1,783,957	—
In other works of same company.....	1,354,627	1,399,066	1,318,796	(*)
Assigned value.....	547,528	443,527	465,161	—
Steel rods—				
Cold - rolled, cold-drawn, cold-hammered, or polished—				
Number of establishments.....	12	—	—	—
Tons.....	145,697	(*)	(*)	(*)
Value.....	\$17,682,981	—	—	—
Rolled wire rods in coils or bars, of crucible or electric steel—				
Number of establishments.....	8	—	—	—
Tons.....	15,358	—	—	—
Value.....	\$4,767,443	(*)	(*)	(*)
Plates or sheets, other than for tinning—				
Number of establishments.....	135	99	105	—
Tons.....	6,720,191	3,699,249	3,332,733	1,856,460
Value.....	\$528,621,423	\$129,785,963	\$133,272,393	\$77,802,001
For sale—				
Tons.....	5,257,975	2,907,272	2,807,114	(*)
Value.....	\$408,690,562	\$96,442,998	\$108,295,661	—
For consumption, tons.				
Assigned value.....	1,462,216	791,977	525,619	—
According to gauge—				
No. 12 and thicker—				
Tons.....	4,428,998	2,183,775	4,299,144	(*)
Value.....	\$295,024,025	\$82,768,579	—	—
No. 13 and thinner—				
Tons.....	2,293,193	1,515,474	4,940,580	(*)
Value.....	\$227,697,398	\$67,017,384	—	—
Black plates (or sheets) for tinning—				
Number of establishments.....	32	30	29	35
Tons.....	1,034,175	1,011,938	631,435	504,025
Value.....	\$94,456,189	\$43,147,041	\$30,955,967	\$25,297,079
For sale—				
Tons.....	7,107	81,588	56,275	(*)
Value.....	\$922,391	\$3,500,576	\$2,736,306	—
For consumption, tons.				
Assigned value.....	1,077,068	930,355	575,180	—
Skelp—				
Number of establishments.....	38	38	42	—
Tons.....	2,580,064	1,900,844	2,084,286	1,557,690
Value.....	\$151,557,342	\$52,443,303	\$64,514,728	\$46,780,202
For sale—				
Tons.....	379,271	506,380	580,686	(*)
Value.....	\$21,928,360	\$14,021,830	\$18,415,604	—
For consumption, tons.				
In works where produced.....	2,209,793	1,454,464	1,503,600	—
In other works of same company—				
Assigned value.....	1,665,999	1,183,756	1,401,573	(*)
Hoops, bands, and cotton ties—				
Number of establishments.....	34	17	15	—
Tons.....	832,212	603,940	341,043	337,223
Value.....	\$89,885,330	\$19,945,076	\$10,429,681	\$12,760,010
For sale—				
Tons.....	750,394	(*)	(*)	(*)
Value.....	\$63,702,388	—	—	—
For consumption, tons.				
Assigned value.....	81,818	—	—	—
Nail and tack plate—				
Number of establishments.....	7	11	12	—
Tons.....	34,579	50,302	68,557	86,601
Value.....	\$2,518,485	\$2,008,308	\$2,640,022	\$2,462,076
For sale—				
Tons.....	18,590	19,751	25,887	(*)
Value.....	\$1,777,166	\$903,352	\$960,492	—
For consumption, tons.				
Assigned value.....	15,989	30,551	42,690	(*)
Axes, rolled or forged—				
Number of establishments.....	7	10	8	—
Tons.....	5,97,813	5,89,436	102,348	83,585
Value.....	\$9,752,973	\$3,407,271	\$3,831,344	\$2,875,829

<sup>2</sup> Figures not available.<sup>3</sup> Plates "16 gauge and thicker" and sheets "17 gauge and thinner."<sup>4</sup> Includes for 1919, 1,508 tons of axles other than car and locomotive (automobile, carriage, etc.), valued at \$317,774; and for 1914, 1,160 tons valued at \$96,069.

## MANUFACTURES.

TABLE 47.—PRODUCTS: 1919, 1914, 1909, AND 1904—Continued.

PRODUCT.	1919	1914	1909	1904
I. Rolled, forged, and other classified steel and iron products—Continued.				
A.—Finished rolled products and forgings—Continued.				
Armor plate, gun forgings, and ordnance—				
Number of establishments.....	13	6	5	4
Tons.....	101,130	33,669	26,845	24,433
Value.....	\$55,699,658	\$19,947,593	\$10,649,079	\$10,549,620
Car and locomotive wheels, rolled or forged—				
Tons.....	117,763	(1)	(1)	(1)
Value.....	\$17,044,728	.....	.....	.....
All other rolled products—				
Tons.....	787,475	619,674	566,627	377,665
Value.....	\$75,686,987	\$37,125,670	\$30,570,061	\$16,743,727
All forged or other iron and steel products, not otherwise enumerated—				
Tons.....	309,965	411,402	365,986	274,061
Value.....	\$38,558,021	\$19,165,900	\$18,740,241	\$15,684,967
B.—Semifinished rolled products (for sale or for transfer to other works of same company)—				
Tons.....	9,265,930	6,408,030	6,790,436	4,074,511
Value.....	\$389,596,293	\$130,674,909	\$153,493,360	\$113,552,102
Blooms, billets, and slabs, steel—				
Tons.....	6,024,044	3,991,873	4,887,796	4,823,585
Value.....	\$249,394,038	\$80,638,672	\$108,514,747	\$109,611,104
For sale—				
Tons.....	2,039,349	1,414,610	1,841,819	(1)
Value.....	\$90,124,414	\$29,700,572	\$43,021,988	(1)
For consumption in other works of producer—				
Tons.....	3,984,695	2,577,254	3,045,977	(1)
Assigned value.....	\$158,269,669	\$50,932,100	\$65,492,750	(1)
Rolled blooms, billets, and slabs, for forging purposes—				
Tons.....	186,533	65,930	84,383	(1)
Value.....	\$10,669,633	\$1,605,637	\$2,247,133	(1)
Hammered charcoal blooms, billets, and slabs—				
Tons.....	17,785	(1)	(1)	(1)
Value.....	\$920,704	(1)	(1)	(1)
Sheet and tin-plate bars—				
Tons.....	2,864,578	2,241,735	1,652,761	(2)
Value.....	\$117,855,738	\$45,375,785	\$37,745,260	(2)
For sale—				
Tons.....	2,555,741	2,088,760	1,025,408	(1)
Value.....	\$104,597,932	\$42,308,755	\$37,105,869	(1)
For consumption in other works of producer—				
Tons.....	308,837	152,966	27,333	(1)
Value.....	\$13,257,506	\$3,064,030	\$639,400	(1)
Muck and scrap bar—				
Tons.....	172,090	108,483	174,406	150,926
Value.....	\$10,755,035	\$2,967,815	\$4,986,211	\$3,040,998
For sale—				
Tons.....	62,039	89,370	154,431	(1)
Value.....	\$4,146,609	\$2,879,056	\$4,280,989	(1)
For consumption in other works of producer—				
Tons.....	110,951	19,104	20,065	(1)
Value.....	\$6,609,326	\$588,759	\$606,242	(1)
Made and consumed in same works, tons.				
Blooms, billets, and slabs, steel—				
Tons.....	19,344,166	18,102,896	11,375,622	(1)
Hammered charcoal blooms, billets, and slabs—				
Tons.....	33,692	35,794	.....	.....
Rolled blooms and billets, for forging purposes—				
Tons.....	124,321	68,850	76,014	.....
Value.....	1,289,851	723,350	441,637	(1)
Muck and scrap bar—				
Tons.....	733,509	958,640	1,191,823	(1)
C.—Unrolled steel (for sale or transfer to other works of same company)				
Tons.....	1,433,170	632,572	647,601	483,729
Value.....	\$167,959,202	\$46,117,166	\$42,450,174	\$24,598,446
Ingots—				
Tons.....	713,027	63,371	142,745	196,404
Value.....	\$33,315,197	\$1,383,468	\$3,503,726	\$3,985,310
For sale—				
Tons.....	219,013	29,421	30,444	(1)
Value.....	\$15,848,348	\$737,382	\$1,513,445	(1)

<sup>1</sup> Figures not available.<sup>2</sup> Included above with blooms, billets, and slabs.

TABLE 47.—PRODUCTS: 1919, 1914, 1909, AND 1904—Continued.

PRODUCT.	1919	1914	1909	1904
I. Rolled, forged, and other classified steel and iron products—Continued.				
C.—Unrolled steel—Con.				
Ingots—Continued.				
For consumption in other works of producer—				
Tons.....	494,014	33,950	112,301	(1)
Assigned value.....	\$17,466,849	\$646,086	\$2,080,281	(1)
Direct steel castings—				
Tons.....	720,143	569,201	504,856	287,335
Value.....	\$134,644,005	\$44,733,698	\$38,862,448	\$20,600,136
II. Scrap iron or steel:				
For sale—				
Tons.....	1,840,700	988,210	840,118	
Value.....	\$24,487,435	\$11,660,297	\$12,632,772	877,177
For consumption in other works of producer—				
Tons.....	773,855	462,948	398,436	11,079,831
Assigned value.....	\$12,926,837	\$4,074,546	\$5,530,852	
Made and consumed in same works, tons.....	9,343,128	5,505,122	5,126,093	(1)
III. All other steel or iron products, not rolled, including value added to iron and steel rolling-mill products by further manufacture.....	\$345,902,346	\$85,238,964	\$86,534,369	\$61,977,284
IV. All products other than steel or iron—				
Custom work and repairing.....	\$22,265,923	\$15,103,136	\$10,356,078	
	\$6,307,289	\$1,705,584	\$1,324,852	\$15,619,668

<sup>1</sup> Figures not available.

Finished rolled products and forgings.—Comparative statistics, by states, of the production of finished rolled products and forgings for the census years 1904 to 1919, inclusive, are given in Table 48.

TABLE 48.—FINISHED ROLLED PRODUCTS AND FORGINGS—PRODUCTION, RANKED BY STATES: 1919, 1914, 1909, AND 1904.

[Ton, 2,240 pounds.]

STATE.	1919	1914	1909	1904	PER CENT DISTRIBUTION.			
					1919	1914	1909	1904
United States.	25,512,847	18,482,182	10,276,237	12,759,993	100.0	100.0	100.0	100.0
Pennsylvania.	12,143,217	9,374,588	9,903,102	6,923,608	47.6	50.7	51.4	54.3
Ohio.	4,984,114	3,449,352	3,097,420	1,659,272	19.5	18.7	16.1	13.0
Indiana.	2,057,207	1,566,951	965,174	407,150	10.4	8.5	5.0	3.2
Illinois.	1,050,308	1,451,584	2,050,120	1,301,870	6.5	7.9	10.8	10.2
New York.	936,785	624,773	798,225	533,726	3.7	3.4	4.1	4.2
Alabama.	689,109	392,909	(1)	(1)	2.7	2.1	.....	.....
Maryland.	198,872	(1)	(1)	(1)	0.8	.....	.....	.....
West Virginia.	685,528	437,651	437,388	288,703	2.7	2.4	2.3	2.3
Massachusetts.	187,636	129,162	160,613	143,320	0.7	0.7	0.8	1.1
Wisconsin.	(1)	107,173	260,226	180,269	0.6	1.3	1.5	1.5
New Jersey.	180,472	119,807	137,679	149,724	0.7	0.6	0.7	1.2
California.	144,490	60,221	50,031	30,406	0.6	0.3	0.3	0.2
Kentucky.	80,290	94,330	127,851	143,566	0.3	0.5	0.7	1.1
Missouri.	89,057	(2)	(2)	(2)	0.3	.....	.....	.....
Delaware.	64,148	(2)	(2)	(2)	0.3	.....	.....	.....
Connecticut.	47,161	(2)	(2)	(2)	0.2	.....	.....	.....
Michigan.	2,077	(2)	(2)	(2)	0.1	.....	.....	.....
All other states.	772,315	673,121	1,261,442	989,223	3.0	3.6	6.5	7.7

<sup>1</sup> Included in "All other states."<sup>2</sup> Figures not available.<sup>3</sup> Less than one-tenth of 1 per cent.

Number of establishments.—The number of establishments reporting the various classes of products is given in Table 49, distributed by states, in comparison with the same information for 1914.

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TABLE 49.—NUMBER OF ESTABLISHMENTS MANUFACTURING SPECIFIED PRODUCTS: 1919 AND 1914.

STATE.	Total number of establish-ments.	Rails	Re-rolled or renewed rails.	Rail fastenings.	Structural shapes	MERCHANT bars, etc.	Bars for reinforced concrete.	Wire rods.	Plates and sheets.	Black plates for tinning.	Skelp, flue, and pipe.	Hoops, bands, and cotton ties.	Axles.	Nail and tack plate.	Armor plate, gun forgings, and ordnance.	Muck and scrap bar.	Steel.	Steel ingots.	Steel castings.
	1919	1914	1919	1914	1919	1914	1919	1914	1919	1914	1919	1914	1919	1914	1919	1914	1919	1914	
United States.....	500	427	16	15	6	8	24	26	33	35	147	117	34	20	49	32	135	99	32
Alabama.....	9	6	3	2					2	1	3	3	2	2	2	3	1	1	3
California.....	8	7							1	1	1	1	4	4	2	2	3	2	2
Colorado.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Connecticut.....	7	4											2	2	2	2	2	2	2
Delaware.....	6	5											2	2	2	2	2	2	2
District of Columbia.....	1	1											1	1	1	1	1	1	1
Georgia.....	1	1											1	1	1	1	1	1	1
Illinois.....	32	25	1	1			3	2	1	3	8	11	2	2	4	3	6	19	14
Indiana.....	23	19	1	1			3	3	2	4	9	7	3	4	2	2	7	10	8
Iowa.....	2										1						2		1
Kentucky.....	5	6									1	1	1	1	1	1	1	3	2
Maine.....	1	1									1	1	1	1	1	1	1	1	2
Maryland.....	5	3	1	1	1	1			1	1	1	1	1	1	1	1	1	2	2
Massachusetts.....	11	11							1	1	1	1	1	1	1	1	1	1	7
Michigan.....	7	9									1					5	6	1	6
Minnesota.....	2	1							1	1	1	1	1	1	1	1	2	1	1
Missouri.....	5	3									1	1	1	1	1	1	2	1	1
New Jersey.....	18	15							1	1	1	1	1	1	1	1	6	5	4
New York.....	30	24	1	1			2	2	1	1	18	9	1	2	5	2	4	7	13
Ohio.....	80	70	1	1	1	1	3	3	5	4	17	11	6	4	10	0	35	26	18
Oklahoma.....	1															1	1	1	1
Oregon.....	1	1														1	1	1	1
Pennsylvania.....	198	178	6	6	2	3	7	11	16	18	58	48	11	8	15	11	62	48	11
Rhode Island.....	3	3									1	1	1	1	1	1	1	2	2
Tennessee.....	1	1									1	1	1	1	1	1	1	1	1
Texas.....	1	1									1	1	1	1	1	1	1	1	1
Utah.....	1										1					1	1	1	1
Virginia.....	2	2					1	1	1	1	2	2	1	1	1	1	2	1	1
Washington.....	3	1					1	1	1	1	1	1	1	1	1	1	1	2	1
West Virginia.....	20	15	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5	4	3
Wisconsin.....	12	12	1	1	1	1	1	1	1	1	1	1	1	1	1	1	10	11	9

**Disposition of products.**—In Table 50 are presented for 1919 the tonnage and value of the finished rolled and forged products of the industry, classified by kinds and whether produced for consumption or for sale, with percentages of distribution. The nature of some

of the products fixes their disposition either for consumption, or for sale, in their entirety, but the average of the total shows that approximately two-thirds were made for sale and one-third for consumption by the producer in further manufacture.

TABLE 50.—DISPOSITION OF FINISHED ROLLED PRODUCTS AND FORGINGS: 1919.

[Ton, 2,240 pounds.]

CLASS.	TOTAL (SHOWN IN TABLE 47).	FOR CONSUMPTION IN WORKS WHERE PRODUCED.		FOR TRANSFER TO OTHER WORKS OF SAME COMPANY.		FOR SALE.	
		Tonnage.		Tonnage.		Tonnage.	
		Amount.	Per cent of class total.	Amount.	Per cent of class total.	Amount.	Per cent of class total.
All finished rolled products and forgings.....	25,512,847	\$1,859,457,051	5,901,262	23.4	\$398,320,778	2,207,833	8.6
Rails.....	2,088,838	92,840,481	6,087	0.3	290,884	12,087	0.6
Berolled or renewed rails.....	95,037	4,738,883					
Rail fastenings.....	402,091	27,598,021	0,708	1.6	242,836	57,885	12.5
Structural shapes.....	2,520,401	151,970,064	77,178	3.1	4,196,998	71,029	2.8
Bars for reinforced concrete.....	301,463	18,428,795	106	0.1	11,919	320	0.1
Merchant bars.....	4,484,907	380,560,457	207,918	5.6	28,259,201	96,629	2.2
Spike and chain rods, bolt and nut rods, horseshoe bars, etc.....	232,020	15,333,748	210,775	90.5	13,442,131	10,508	4.5
Wire rods.....	2,645,483	149,188,566	1,859,244	51.4	69,425,824	550,936	20.8
Plates and sheets.....	6,720,191	523,021,423	1,253,642	18.7	98,839,735	208,574	3.1
Black plates or sheets for tinning.....	1,084,175	94,456,189	521,211	48.1	45,261,063	555,857	51.3
Skelp.....	2,589,064	151,557,342	1,605,999	64.3	97,727,501	543,794	21.0
Hoops, bands, and cotton ties.....	832,212	69,866,330	45,169	5.4	3,026,096	36,649	4.4
Nail and tack plate.....	34,570	2,548,485	18,939	40.3	672,417	2,050	5.9
Axles.....	97,813	9,752,073					
Cat and locomotive wheels, rolled or forged.....	117,763	17,044,728			46	(1)	0.1
Armor plate, gun forgings, and ordnance.....	101,130	55,699,058			6,202	117,718	100.0
All other.....	1,097,440	114,246,008	502,506	45.8	38,224,805	61,407	5.6
					4,670,253	533,487	48.6
						71,349,950	

<sup>1</sup> Less than one-tenth of 1 per cent.

Production and disposal of semifinished rolled products and unrolled steel.—The production of semifin-

ished iron and steel products and of unrolled steel in 1919 has been classified as shown in Table 51.

TABLE 51.—DISPOSITION OF SEMIFINISHED PRODUCTS: 1919.  
[Ton, 2,240 pounds.]

CLASS.	Total (tons).	For consumption in works where produced (tons).	FOR SALE OR TRANSFER TO OTHER WORKS.					
			Total (shown in Table 47).		For transfer to other works of same company.			
			Tons.	Value.	Tons.	Assigned value.		
Partly finished rolled products.....	30,701,400	21,525,539	9,205,930	\$389,590,293	4,420,707	\$179,902,384	4,845,103	\$209,083,909
Blooms, billets, and slabs, steel.....	25,368,210	10,344,106	6,024,044	249,394,083	3,984,695	159,269,669	2,039,340	90,124,414
Rolled blooms and billets for forging purposes.....	310,854	124,321	186,533	10,669,833	7,873	385,703	178,680	10,280,127
Hammered charcoal blooms, billets, and slabs.....	51,477	33,092	17,785	920,704	8,411	375,877	9,374	544,827
Sheet and tin-plate bars.....	4,154,429	1,289,851	2,864,578	117,855,738	308,837	13,257,306	2,555,741	104,597,932
Muck and scrap bar.....	900,499	733,509	172,900	10,755,935	110,951	6,001,326	62,080	4,140,609
Unrolled steel.....	33,994,658	32,599,006	1,395,592	162,322,502	507,309	19,548,123	888,223	142,774,379
Ingots.....	33,274,515	32,561,498	713,027	33,315,197	494,014	17,406,849	219,013	15,848,348
Direct castings.....	720,143	37,578	1,082,565	1,129,007,305	13,355	2,081,274	609,210	126,925,631

<sup>1</sup> Exclusive of 37,578 tons, valued at \$5,636,700, consumed in works where produced, which are included in Table 47.

Summary as to distribution of products.—Table 52 gives for 1919, 1914, and 1909 comparative statistics of the various principal products of steel works and rolling mills. Duplication due to the same article appearing as product in one case and material in

another of the same or affiliated plants has been eliminated in this table, but this can not be avoided in cases where semifinished rolled products are produced by independent concerns for use in further manufacture.

TABLE 52.—SUMMARY AS TO DISPOSITION OF PRODUCTS: 1919, 1914, AND 1909.  
[Ton, 2,240 pounds.]

CLASS.	Census year.	Total (tons).	For consumption in works where produced (tons).	FOR TRANSFER TO OTHER WORKS OF SAME COMPANY.		IN FORM AND CONDITION FOR SALE.	
				Tons.	Assigned value.	Tons.	Value.
				Amount.	Per cent of total.	Amount.	Per cent of total.
Total.....	1910						
	1914						
	1909						
Finished rolled products and forgings.....	1919	25,512,847	5,961,262	2,207,838	149,229,387	17,343,747	1,311,906,886
	1914	18,482,182	4,146,493	1,755,432	62,277,390	12,580,257	434,016,707
	1909	19,276,237	4,045,272	1,206,415	47,035,208	14,024,550	491,697,011
Semifinished rolled products.....	1919	9,205,930		4,420,707	179,902,384	4,845,103	209,083,909
	1914	6,408,030		2,749,324	54,584,889	3,058,706	76,000,020
	1909	6,799,436		3,098,395	66,828,401	3,706,041	80,664,959
Steel ingots and castings.....	1919	33,994,658	1,82,599,066	507,369	10,548,123	888,223	142,774,379
	1914	23,383,474	22,758,495	33,980	646,086	591,029	44,945,290
	1909	23,473,718	22,883,167	112,301	2,080,281	478,250	36,213,039
Manufactures from rolling-mill products .....	1919						
	1914						
	1909						
Scrap iron and steel.....	1910	11,467,773	9,343,128	773,855	12,026,837	1,340,790	24,487,435
	1914	7,041,286	6,558,122	462,948	4,074,546	983,216	11,660,297
	1909	6,364,647	5,126,093	398,436	5,530,852	840,118	12,632,772
Castings, other than direct steel.....	1919	240,037				240,037	
	1914	116,536				116,536	5,314,946
	1909	128,670				128,670	5,520,899
Products, other than steel and iron and custom work and repairing.....	1919						
	1914						
	1909						

<sup>1</sup> Includes castings used by the companies producing and in other tables credited to products with value: 37,578 tons, estimated value, \$5,636,700.

<sup>2</sup> Does not include tonnage of cast-iron pipe and fittings valued at \$304,462 which is included in total value.

<sup>3</sup> Included with products "in form and condition for sale."

Manufactures from rolling-mill products.—Statistics of the principal articles fabricated in rolling mills in 1919, 1914, and 1909 from rolled products are given in Table 53, with the output of the same commodity as reported by establishments engaged primarily in other lines of manufacture. With

respect to the latter products it should be said that figures for quantity production are not available, the establishments reporting only the total value of products, which includes to a greater or less extent products other than the specific one mentioned.

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TABLE 53.—PRINCIPAL MANUFACTURES FROM ROLLING-MILL PRODUCTS: 1919, 1914, AND 1909.

KIND.	1919	1914	1909	PER CENT OF INCREASE. <sup>1</sup>		KIND.	1919	1914	1909	PER CENT OF INCREASE. <sup>1</sup>	
				1914-1919	1909-1914					1914-1919	1909-1914
Spirks, bolts, nuts, rivets, and washers, etc.: Made in rolling mills— Railroad spikes, bolts, and nuts— Number of establishments.....	18					Pipes and tubes—Continued. Made in rolling mills—Con. Wrought welded—Con. Seamless, hot-finished or cold-drawn— Number of establishments.....	9	5	4		
Kegs (200 pounds)..... Value.....	1,230,834	\$10,148,232				Tons.....	165,934	64,765	54,273	156,0	19.3
Bolts, nuts, rivets, washers, etc. (except railroad)— Number of establishments.....	43	35		-20.1	-22.7	Value.....	\$43,774,410	\$5,821,467	\$5,650,739	652,0	3.0
Kegs (200 pounds)..... Value.....	3,457,710	\$13,883,773	4,471,955	114.0	-32.4	All other— Tons.....	23,967	17,345	17,561	38.2	-1.2
Not made in rolling mills— Bolts, nuts, rivets, washers, etc.— Number of establishments.....	28					Value.....	\$2,351,201	\$834,209	\$986,699	182.0	-15.5
Kegs (200 pounds)..... Value.....	1,532,400	\$19,580,295				Not made in rolling mills— Number of establishments.....	50	36	28		
Nails and spikes (not wire): Made in rolling mills— Cut nails and spikes— Number of establishments.....	144	102	108	283.0	-4.4	Value of products.....	\$81,860,115	\$37,655,229	\$30,886,270	117.0	21.9
Kegs (100 pounds)..... Value.....	\$89,743,882	\$23,403,405	\$24,484,007			Horse and mule shoes: Made in rolling mills— Number of establishments.....	14	11	11		
Wire nails and spikes, made in rolling mills and wire-drawing mills— Kegs (100 pounds)..... Value.....	203,890	\$1,334,168	740,436	1,000,319	-64.4	Kegs (200 pounds).....	724,539	1,015,230	996,383	-28.6	1.9
Wire brads, tacks, and staples, made in rolling mills and wire-drawing mills— Pounds..... Value.....	6	10	12	-0.2	-33.7	Value.....	\$8,420,052	\$7,122,462	\$7,202,897	18.2	-1.1
Not made in rolling mills (nails and spikes): Number of establishments.....	65	64	57			Not made in rolling mills— Number of establishments.....	20	22	19		
Chief product— Cut nails, value..... Wire nails, value..... Other, including tacks, value.....	\$2,056,130	\$1,735,070	\$6,135,160	\$1,334,432	\$8,191,820	Value of products.....	\$3,367,001	\$1,785,993	\$1,014,576	88.5	76.0
Pipes and tubes (not including cast pipe): Made in rolling mills— Wrought welded— Boiler tubes— Number of establishments.....	8				-12.1	Made in rolling mills— Cars.....	\$8,507,478				
Tons..... Value.....	60,550	\$11,907,024				Machinery.....	\$8,984,646				
Casing, tubing, drain, and line pipe for production and transportation of oil and gas, and for other drilled wells— Number of establishments.....	10	13	15			Switches, frogs, and crossings— Tons.....	\$7,342,690	\$7,720,178	220.1	-4.9	
Tons..... Value.....	922,016	1,130,652	1,314,771	74.3	-14.0	Value.....	\$6,029,213				
Other black pipe— Number of establishments.....	12					Springs: Made in rolling mills— Car— Number of establishments.....	5	7	6		
Tons..... Value.....	772,114	\$70,490,728				Tons.....	17,681	11,889	6,101	59.1	92.0
Other galvanized pipe— Number of establishments.....	10	11				Value.....	\$2,970,737	\$872,863	\$374,924	200.0	138.0
Tons..... Value.....	211,348	\$23,175,064				Other springs.....	\$175,348				
						Not made in rolling mills— Number of establishments.....	112	84	54		
						Value of products.....	\$51,470,535	\$11,594,992	\$9,005,362	344.0	28.8
						Steel and iron wire and manufacturers thereof (see Wire):	\$101,907,217	\$67,353,214	\$71,624,024	185.0	-6.0
						Tin-plate and terneplate dipping departments of rolling mills (see Tin plate and terneplate):	\$82,920,648	(*)	(*)		
						Sheets, black or common, corrugated, crimped, polished, or glazed, made in rolling mills: Number of establishments.....	15				
						Tons.....	223,915	(*)	(*)		
						Value.....	\$28,048,058				
						Galvanized plates or sheets, made in rolling mills: Number of establishments.....	23	26	22		
						Tons.....	555,192	971,189	431,658	-42.8	125.0
						Value.....	\$66,793,934	\$42,862,394	\$25,912,056	55.8	65.4
						Hoops and bands, galvanized, made in rolling mills: Number of establishments.....	44,708	(*)	(*)		
						Tons.....	\$3,990,822				
						Structural shapes, fabricated, and pressed, stamped or shaped, made in rolling mills: Number of establishments.....	20				
						Tons.....	368,300	(*)	(*)		
						Value.....	\$31,340,452				

<sup>1</sup> A minus sign (—) denotes decrease.<sup>2</sup> Included in tin-plate and terneplate industry as separate establishments.<sup>3</sup> Not reported separately.

## MANUFACTURES.

## STEEL PRODUCTION.

**Summary.**—A summary of steel production for the last four censuses, by kind and by type of furnace or process, is given in Table 54, with the percentages of increase and distribution.

The production of steel

slag in 1919 is estimated at 2,826,000 tons; this on the basis of 10 per cent of steel production for basic O-H steel furnaces, 8 per cent for acid O-H steel, and 2.5 per cent for Bessemer steel.

TABLE 54.—STEEL PRODUCTION, BY KINDS: 1919, 1914, 1909, AND 1904.

[Ton, 2,240 pounds.]

KIND.	1919	1914	1909	1904	PER CENT OF INCREASE. <sup>1</sup>			PER CENT DISTRIBUTION.			
					1914-1919	1909-1914	1904-1909	1919	1914	1909	1904
					45.4	-0.5	72.1	100.0	100.0	100.0	100.0
Total <sup>2</sup> .	34,026,979	23,403,957	23,523,199	13,670,592	45.4	-0.5	72.1	100.0	100.0	100.0	100.0
Open-hearth.					56.5	20.1	144.0	78.5	72.4	60.5	42.6
Basic.	26,726,036	17,081,375	14,228,377	5,820,397	58.4	22.7	161.0	75.5	69.4	58.2	37.0
Acid.	25,709,530	16,234,628	12,221,093	5,084,502	20.0	-15.9	33.3	3.0	3.6	4.3	5.5
Bessemer.	1,016,500	846,749	1,007,284	755,805	11.7	-32.3	18.2	20.4	26.6	39.0	56.8
Crucible.	6,910,169	6,219,304	9,180,133	7,765,915	-21.4	-18.5	25.2	0.2	0.3	0.4	0.6
Electric or electrically refined.	64,245	81,685	100,263	80,059	1,242.0	49.7	1,081.5	0.9	0.1	0.1	(*)
Ingots.	289,750	21,593	14,426	1,221	45.9	-0.7	71.7	100.0	100.0	100.0	100.0
Castings.	83,289,039	22,815,266	22,973,964	13,379,083	25.2	7.2	88.4	100.0	100.0	100.0	100.0
Open-hearth.	26,099,319	16,551,427	13,725,788	5,548,396	57.7	20.6	147.0	78.4	72.4	59.7	41.5
Basic.	25,444,169	15,933,420	12,952,840	4,074,921	59.7	23.0	160.0	76.4	69.8	56.4	37.2
Acid.	655,150	618,007	772,943	573,475	6.0	-20.0	34.8	2.0	2.7	3.4	4.8
Bessemer.	6,901,315	6,175,867	9,145,668	7,754,488	11.7	-32.4	17.9	20.7	27.1	39.8	58.0
Crucible.	63,028	72,765	90,242	76,199	-13.4	-19.4	18.4	0.2	0.4	0.4	0.6
Electric or electrically refined.	226,277	15,207	12,271	-----	1,380.0	23.9	-----	0.7	0.4	0.4	0.6
Crucible.	737,040	588,691	549,235	291,509	-----	-----	-----	100.0	100.0	100.0	100.0
Open-hearth.	626,717	529,948	502,594	272,001	18.3	5.4	84.8	85.0	90.0	91.5	93.3
Basic.	265,367	301,206	268,253	89,671	-11.9	12.3	199.0	36.0	51.2	48.8	30.8
Acid.	361,350	228,742	234,341	182,330	58.0	-2.4	28.5	49.0	38.8	42.7	62.5
Bessemer.	45,624	43,437	34,465	14,427	5.0	26.0	139.0	6.2	7.4	6.3	4.9
Crucible.	1,217	8,020	10,021	3,860	-86.4	-11.0	160.0	0.2	1.5	1.8	1.3
Electric or electrically refined.	63,482	6,386	2,155	1,221	894.0	196.3	76.5	8.6	1.1	0.4	0.4

<sup>1</sup> A minus sign (—) denotes decrease.<sup>2</sup> Includes steel produced by establishments not classified as "steel works and rolling mills" as follows: 1919—32,321 tons, including open-hearth, 30,815 (basic 14,731, acid 16,084), and electric or electrically refined 1,500; 1914—20,483 tons, including open-hearth 18,090 (basic 1,527, acid 16,583), Bessemer 499, and crucible 1,894; 1909—49,481 tons, including open-hearth 36,099 (basic 10,674, acid 25,425), Bessemer 6,068, crucible and miscellaneous, 7,816; 1904—4,184 tons, including open-hearth (basic) 2,440, Bessemer 774, crucible and miscellaneous, 970.<sup>3</sup> Less than one-tenth of 1 per cent.

**Production, by states.**—Table 55 presents the figures for steel production, by states, distributed for 1919 and 1914 by kind—open-hearth, Bessemer, and all other steels.

TABLE 55.—STEEL PRODUCTION, BY KIND AND BY STATES: 1919, 1914, 1909, AND 1904.

[Ton, 2,240 pounds.]

STATE.	1919	1914	1909	1904	PER CENT DISTRIBUTION.				OPEN-HEARTH STEEL.		BESSEMER STEEL.		CRUCIBLE, ELECTRIC, AND MISCELLANEOUS.	
					1919	1914	1909	1904	1919	1914	1919	1914		
					1919	1914	1909	1904	1919	1914	1919	1914		
Total.	34,026,979	23,403,957	23,523,199	13,670,592	100.0	100.0	100.0	100.0	26,726,036	17,081,375	6,940,930	6,219,304	354,004	103,273
California.	139,866	(1)	(1)	(1)	0.4	-----	-----	-----	135,415	(1)	(1)	(1)	4,451	-----
Delaware.	104,837	(1)	(1)	(1)	0.3	-----	-----	-----	101,573	(1)	3,264	(1)	-----	-----
Illinois.	2,612,204	1,770,753	2,671,087	1,555,198	7.7	7.6	11.4	11.4	1,661,073	891,336	901,010	867,804	50,121	11,613
Indiana.	3,133,640	1,662,839	779,778	81,589	9.2	7.1	3.3	0.6	3,121,344	1,662,441	9,261	(1)	8,035	398
Kentucky.	268,687	(1)	(1)	(1)	0.8	-----	-----	-----	223,782	(1)	44,905	(1)	-----	-----
Massachusetts.	185,587	(1)	(1)	(1)	0.5	-----	-----	-----	183,746	(1)	360	(1)	1,481	-----
Michigan.	24,754	6,245	10,460	2,500	0.1	(1)	(2)	(2)	12,080	2,819	3,337	1,645	9,328	1,781
New Jersey.	204,150	140,495	95,851	68,288	0.6	0.6	0.4	0.5	183,168	127,285	3,902	7,414	17,020	5,788
New York.	1,196,881	745,441	1,118,250	474,258	3.5	3.2	4.8	3.5	1,074,444	603,642	55,769	110,998	63,668	21,801
Ohio.	8,175,993	5,451,608	4,718,869	2,629,997	24.0	23.3	20.0	18.5	5,078,637	2,591,062	3,039,293	2,860,129	58,063	317
Pennsylvania.	15,308,086	11,851,400	12,206,608	7,733,640	44.9	50.6	51.9	56.6	12,598,507	9,754,623	2,583,892	2,039,274	126,187	57,603
West Virginia.	331,407	(1)	(1)	(1)	1.0	-----	-----	-----	94,678	(1)	236,729	(1)	-----	-----
Wisconsin.	32,821	18,604	21,888	9,215	0.1	0.1	0.1	0.1	15,986	12,435	5,776	4,302	11,059	1,857
All other states.	2,308,066	1,756,872	1,908,418	1,216,907	6.9	7.5	8.1	8.9	2,241,594	1,435,832	56,881	318,738	9,581	2,102

<sup>1</sup> Included with "All other states."<sup>2</sup> Less than one-tenth of 1 per cent.<sup>3</sup> Includes, in the order of production in 1919, Alabama, Colorado, Maryland, Minnesota, Connecticut, Washington, Georgia, Rhode Island, Missouri, Utah, District of Columbia, Iowa, Oregon, and Virginia; and in 1914, 1909, and 1904, also Kentucky, Massachusetts, West Virginia, California, and Delaware.

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**Disposal of output.**—The disposition made of the steel product, whether sold to unaffiliated concerns, or used in the establishment producing it, or in other works of the same company, is given in Table 56 for 1919, 1914, and 1909.

TABLE 56.—STEEL PRODUCTION, FOR CONSUMPTION AND FOR SALE: 1919, 1914, AND 1909.  
[Ton, 2,240 pounds.]

Kind.	Cen-	Total.	FOR CONSUMPTION BY PRO-			For
			Total,	In	For	
	sus-		for	works	transfer	
			consump-	where	to other	sale.
				produced.	works	
Total.....	1919	34,020,979	33,129,598	1,32,015,754	513,844	+897,381
	1914	23,403,957	22,803,890	1,22,760,940	33,950	+2,600,067
	1909	23,523,199	23,033,040	22,920,739	112,301	490,159
Open-hearth.....	1919	26,726,036	25,951,030	25,627,493	323,837	774,706
	1914	17,081,375	16,540,828	16,508,741	32,087	540,547
	1909	14,228,377	13,781,534	13,700,101	72,433	446,843
Basic.....	1919	25,709,536	25,291,989	24,984,654	307,335	417,547
	1914	16,234,026	15,908,028	15,870,024	32,004	323,998
	1909	13,221,093	12,077,845	12,908,030	69,815	243,248
Acid.....	1919	1,016,500	659,341	642,839	16,502	357,159
	1914	846,749	632,200	632,117	83	214,549
	1909	1,007,284	803,080	801,071	2,618	203,505
Bessemer.....	1919	6,946,939	6,891,706	6,703,500	188,146	55,233
	1914	6,219,304	6,175,855	6,174,094	1,761	43,449
	1909	9,180,133	9,148,530	9,108,813	39,726	31,594
Crucible.....	1919	64,245	62,908	62,473	435	1,337
	1914	81,685	72,034	71,932	102	9,051
	1909	100,263	88,890	88,748	142	11,373
Electric or electrically refined.....	1919	289,759	223,654	222,228	1,426	66,105
	1914	25,593	15,173	15,173	.....	6,420
	1909	14,426	14,077	14,077	.....	349

<sup>1</sup> Includes in 1919, 32,576,210 tons of ingots and 39,535 tons of castings, the latter distributed as follows: Basic O-H, 22,795 tons; acid O-H, 15,808 tons; Bessemer, 615 tons; and electric or electrically refined, 317 tons; and in 1914, 22,751,830 tons of ingots and 18,110 tons of castings, the latter distributed as follows: Basic O-H, 716 tons; acid O-H, 16,560 tons; and crucible, 834 tons.

<sup>2</sup> Includes in 1919, 219,013 tons of ingots and 678,368 tons of castings, the latter distributed as follows: Basic O-H, 240,644 tons; acid O-H, 320,071 tons; Bessemer, 45,04 tons; Crucible, 1,217 tons; and electric or electrically refined, 62,432 tons; and in 1914, 29,488 tons of ingots and 570,581 tons of castings, the latter distributed as follows: Basic O-H, 300,400 tons; acid O-H, 212,182 tons; Bessemer, 43,437 tons; Crucible, 8,083 tons; and electric and all other, 6,386 tons.

**Duplex steel.**—The production of duplex steel, that is steel semifinished in Bessemer converters and finished in open-hearth or electric furnaces was reported in 1919 by 9 establishments, distributed as follows—Illinois, 1; Indiana, 2; Maryland, 1; New York, 1; and Pennsylvania, 4. The total production amounted to 2,078,841 tons in 1919, compared with 401,621 tons in 1914, and 522,682 tons in 1909.

**Alloy steel.**—Statistics of the production of the alloy steels in 1919, 1914, and 1909, are given in Table 57. The production is distributed by method of production or type of furnace, by method of casting whether into ingots for rolling or direct castings, and by kind of alloy.

Of the total production of alloy steel, approximately one-third was used in the manufacture of structural shapes, 30 per cent for merchant bars, and 6 per cent each for rails, armor plate, and ordnance.

TABLE 57.—ALLOY STEEL: 1919, 1914, AND 1909.  
[Ton, 2,240 pounds.]

KIND.	1919	1914	1909	PER CENT OF INCREASE. <sup>1</sup>		PER CENT OF DISTRIBUTION.		
				1914-1919	1909-1914	1919	1914	1909
Number of establishments.....	82	57	36	43.9	58.3	.....	.....	.....
Production, tons.....	1,242,878	305,956	158,216	300.2	93.4	100.0	100.0	100.0
Open-hearth.....	993,015	264,100	100,335	276.0	163.2	79.9	86.3	63.4
Basic.....	844,852	230,408	80,242	206.7	167.2	68.0	75.3	54.5
Acid.....	148,163	33,692	14,093	339.8	139.0	11.9	11.0	8.9
Bessemer.....	30,618	9,146	4,324	234.8	-79.8	2.5	3.0	28.7
Crucible and electric.....	219,245	32,710	12,557	570.2	160.5	17.6	10.7	7.9
Ingots.....	1,203,009	294,128	151,300	309.2	94.4	96.8	96.1	95.6
Castings.....	39,269	11,828	6,916	232.0	71.0	3.2	3.9	4.4
By kind of alloy:								
Nickel-chrome.....	224,280	102,562	26,029	119.0	281.0	18.0	33.6	17.0
Nickel.....	158,951	69,955	37,607	127.0	89.0	12.8	22.9	23.8
Chrome-vanadium.....	126,407	9,280	4,406	1,262.0	111.0	10.2	3.0	2.8
Chrome.....	121,983	23,258	11,269	424.0	106.0	9.8	7.6	7.1
Vanadium.....	118,338	2,565	8,039	4,511.0	-68.1	0.5	0.8	5.1
Titanium.....	52,152	8,477	40,477	515.0	-79.1	4.2	2.8	25.6
Copper.....	31,090	2,759	.....	1,027.0	.....	2.5	0.0	.....
Silicon.....	29,436	.....	.....	.....	.....	2.4	.....	.....
Tungsten.....	27,318	1,4,204	1,697	650.6	148.0	2.2	1.4	1.0
Silicon-manganese.....	9,730	2,240	(*)	334.0	.....	0.8	0.7	(*)
Chrome-tungsten-vanadium.....	2,735	2,334	(*)	17.2	.....	0.2	0.8	(*)
Chrome-tungsten.....	758	1,546	600	-51.0	157.7	(*)	0.5	0.4
Nickel-chrome-vanadium.....	.....	14,123	0,280	.....	52.1	.....	4.6	5.9
Chrome-nickel-titanium.....	.....	1,123	.....	.....	.....	.....	0.4	(*)
Miscellaneous.....	80,393	233	1,106	(*)	.....	6.5	(*)	11.3
Unclassified.....	259,307	61,314	17,912	.....	.....	(20.9)	20.1	.....

<sup>1</sup> A minus sign (—) denotes decrease.

<sup>2</sup> Less than one-tenth of 1 per cent.

<sup>3</sup> Figures not available.

**Steel-making equipment and capacity of steel furnaces.**—Table 58 shows, by states, the daily capacity in tons, of steel on double turn, of the active plants in 1919, together with the production tonnage for the year and the furnace distribution, by states, of capacity and production.

TABLE 58.—STEEL FURNACE CAPACITY AND PRODUCTION, BY STATES: 1919.  
[Ton, 2,240 pounds.]

STATE.	Daily capacity, tons of steel.	Steel production, tons. <sup>1</sup>	PER CENT DISTRIBUTION.	
			Capacity.	Production.
United States.....	103,115	34,020,979	100.0	100.0
Pennsylvania.....	80,325	15,308,086	41.6	45.0
Ohio.....	39,946	8,175,993	20.7	24.0
Illinois.....	10,387	2,612,204	8.5	7.7
Indiana.....	14,021	3,133,640	7.3	9.2
New York.....	11,467	1,198,881	5.9	3.5
Maryland.....	9,213	(*)	4.8	(*)
Alabama.....	5,026	(*)	2.6	(*)
Colorado.....	3,167	(*)	1.6	(*)
Kentucky.....	3,070	268,687	1.6	0.8
West Virginia.....	2,035	331,407	1.0	1.0
Minnesota.....	1,524	(*)	0.8	(*)
New Jersey.....	1,147	204,150	0.6	0.6
California.....	1,128	139,866	0.6	0.4
Delaware.....	1,045	104,837	0.5	0.3
Massachusetts.....	965	185,587	0.5	0.5
Wisconsin.....	410	32,821	0.2	0.1
Connecticut.....	432	(*)	0.2	(*)
Georgia.....	340	(*)	0.2	(*)
Washington.....	321	(*)	0.2	(*)
Missouri.....	312	(*)	0.2	(*)
Michigan.....	301	24,754	0.1	0.1
Utah.....	167	(*)	0.1	(*)
Rhode Island.....	161	(*)	0.1	(*)
District of Columbia.....	120	.....	0.1	(*)
All other states.....	95	\$ 2,308,068	(*)	6.8

<sup>1</sup> Not including steel produced in establishments not included in the classified industry with a daily capacity of 2,157 tons.

<sup>2</sup> Included under "All other states" to avoid disclosure of individual operations.

<sup>3</sup> Includes the product of the states noted above, these states reporting in the aggregate steel furnaces with a total daily capacity of 20,868 tons of steel.

<sup>4</sup> Less than one-tenth of 1 per cent.

## MANUFACTURES.

On a basis of 300 working days, double turn, the annual capacity of all establishments was approximately 58,000,000 tons, an increase of 30 per cent over 1914, and the production in 1919 amounted to approximately 60 per cent of capacity compared with 53 per cent in 1914 and 72 per cent in 1909.

**Mixers.**—Table 59 shows the number and capacity of the metal mixers as reported for the steel plants at the censuses of 1919 and 1914, distributed by states.

TABLE 59.—METAL MIXERS: 1919 AND 1914.

	1919		1914	
	Number.	Capacity (tons).	Number.	Capacity (tons).
	Total	86	38,605	69
Alabama	3	1,250	(1)	(1)
Illinois	8	3,350	9	2,300
Indiana	6	3,200	5	1,500
Maryland	4	2,630	(1)	(1)
New York	6	2,525	3	1,150
Ohio	17	5,500	15	4,300
Pennsylvania	38	18,300	30	9,085
West Virginia	1	250	1	250
All other states	5	1,450	6	2,300

<sup>1</sup> Included with "All other states."

**Open-hearth furnaces.**—Statistics for open-hearth furnaces for 1919, 1914, and 1909, by type of furnace, are presented in Table 60, and the distribution, by size, is shown in Table 61. The average capacity per heat or melt was 52 tons in 1919 and 1914 and 43 tons in 1909.

TABLE 60.—STEEL FURNACES—OPEN-HEARTH, BY KINDS AND BY STATES: 1919 AND 1914.

[Ton, 2,240 pounds.]

STATE.	Census year.	TOTAL.		BASIC.		ACID.	
		Number of establishments.	Number.	Number of establishments.	Number.	Number of establishments.	Number.
		Number.	Daily capacity (tons).	Number.	Daily capacity (tons).	Number.	Daily capacity (tons).
United States	1919	207	1,252	135,922	136	1,039	126,971
	1914	140	864	93,650	99	706	85,471
	1909	129	706	62,161	82	553	55,392
	1904	110	480	34,398	64	341	26,932
Pennsylvania	1919	83	582	60,830	51	460	54,850
	1914	66	488	51,071	45	383	45,689
Ohio	1919	32	222	24,569	24	209	24,080
	1914	20	112	13,087	16	104	12,561
Indiana	1919	10	93	12,495	4	73	11,862
	1914	6	62	8,570	2	54	8,200
New York	1919	11	57	8,498	7	47	8,062
	1914	8	33	8,712	4	25	7,392
Illinois	1919	13	91	8,165	13	91	8,165
	1914	10	60	6,608	9	56	6,345
Maryland	1919	2	13	5,593	2	13	5,593
	1914	2	8	1,825	2	8	1,825
Alabama	1919	2	16	3,496	2	16	3,496
	1914	2	15	3,195	2	15	3,195
Kentucky	1919	2	14	2,470	2	14	2,470
	1914	1	6	625	1	5	500
Colorado	1919	1	15	1,500	1	15	1,500
	1914	1	15	1,500	1	15	1,500

TABLE 60.—STEEL FURNACES—OPEN-HEARTH, BY KINDS AND BY STATES: 1919 AND 1914—Continued.

STATE.	Census year.	TOTAL.		BASIC.		ACID.	
		Number of establishments.	Number.	Number of establishments.	Number.	Number of establishments.	Number.
Minnesota	1919	2	11	1,483	1	10	1,479
California	1910	7	19	1,103	7	18	1,073
	1914	4	6	300	4	6	300
Delaware	1910	3	11	973	2	9	960
	1914	2	4	109	—	2	4
New Jersey	1919	8	27	945	4	11	405
	1914	5	18	752	4	9	491
Massachusetts	1919	7	19	927	2	6	400
	1914	3	10	570	2	5	297
West Virginia	1910	3	7	405	1	4	320
	1914	2	4	285	1	3	245
Connecticut	1910	3	6	388	2	5	368
	1914	1	3	250	1	3	250
Georgia	1919	2	4	345	1	3	340
	1914	1	2	185	1	2	185
Missouri	1919	2	11	456	2	11	456
	1914	1	8	306	1	8	306
Rhode Island	1919	1	3	150	1	3	150
	1914	1	2	100	1	2	100
Michigan	1919	4	6	175	—	4	6
	1914	1	1	40	1	1	40
District of Columbia	1919	1	3	120	1	3	120
	1914	1	2	50	1	2	50
Wisconsin	1919	3	6	115	1	2	20
	1914	2	5	510	2	5	510
All other states <sup>1</sup>	1919	5	16	712	5	16	712
	1914	—	—	—	—	—	—

<sup>1</sup> Comprises Iowa, Utah, and Washington.

TABLE 61.—STEEL FURNACES—OPEN-HEARTH, BY SIZE: 1919, 1914, AND 1909.

[Ton, 2,240 pounds.]

SIZE GROUP.	1919		1914		1909	
	Number.	Capacity per heat or melt (tons).	Number.	Capacity per heat or melt (tons).	Number.	Capacity per heat or melt (tons).
Total	1,341	69,367	864	44,616	706	30,574
Less than 50 tons	576	13,857	346	8,873	367	9,676
50 to 59 tons	224	11,313	189	9,673	137	6,926
60 to 69 tons	130	7,935	127	7,395	105	6,385
70 to 79 tons	132	9,000	92	6,750	51	3,730
80 to 99 tons	170	14,230	57	4,725	44	3,567
100 tons	79	7,900	38	3,800	—	—
Over 100 tons <sup>1</sup>	30	4,532	15	3,300	2	2,250

<sup>1</sup> Includes for 1919, 11 furnaces, 101-109 tons; 3, 110 tons; 3, 140 tons; and 3, 200 tons.

**Converters.**—Table 62 presents the statistics for the converters, by states and by type—Bessemer, Tropenæs, or other—for the United States for the four census years 1904-1919, inclusive, and by states for 1919 and 1914. Of these converters, 31 with a daily capacity of 2,080 tons, were used for the manufacture of duplex steel in 1919, and 12 converters of 12,600 tons daily capacity in 1914.

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TABLE 62.—STEEL FURNACES—CONVERTERS, BY KINDS AND BY STATES: 1919 AND 1914.

[Ton, 2,240 pounds.]

STATE.	Census year.	Number of establish- ments.	TOTAL.		BESSEMER.	TROPE- NAS.	OTHER KINDS.	
			Number.	Daily capac- ity (tons).				
United States.....	1919	105	201	55,931	191	55,024	76	503
	1914	55	115	53,106	64	52,480	30	354
	1900	54	112	49,005	60	48,377	24	348
	1904	44	92	43,123	61	42,075	13	35
Pennsylvania.....	1919	21	48	19,101	20	18,888	16	81
	1914	13	31	19,834	24	19,730	5	34
Ohio.....	1919	23	39	15,201	16	15,060	12	147
	1914	14	24	14,572	14	14,460	6	82
Illinois.....	1919	10	22	8,090	9	8,000	10	83
	1914	4	11	7,067	8	7,000	3	67
Maryland.....	1919	1	7	3,500	7	3,500	—	—
	1914	1	3	2,100	3	2,100	—	—
New York.....	1919	5	11	2,558	4	2,500	5	55
	1914	2	8	2,830	4	2,780	4	50
Colorado.....	1919	2	3	1,600	2	1,600	—	—
	1914	1	2	2,000	2	2,000	—	—
West Virginia.....	1919	2	4	1,630	4	1,630	—	—
	1914	2	4	1,490	4	1,490	—	—
Alabama.....	1919	1	3	1,500	3	1,500	—	—
	1914	1	2	2,200	2	2,200	—	—
Kentucky.....	1919	1	2	600	2	600	—	—
	1914	1	2	600	2	600	—	—
Wisconsin.....	1919	6	10	142	3	60	3	35
	1914	5	8	111	—	—	6	70
All other states.....	1919	1 <sup>1</sup> 33	52	1,850	12	1,610	30	102
	1914	1 <sup>1</sup> 11	20	302	1	120	6	45

<sup>1</sup> Comprises for 1919: Michigan, 6; 3 each for Delaware, Indiana, Massachusetts, and Washington; 2 each for California, Indiana, Iowa, and New Jersey; and 1 each for Connecticut, Minnesota, Missouri, Oregon, Tennessee, Texas, Utah, and Virginia; and in 1914: Delaware, 3; 2 each for Michigan and New Jersey; and 1 each for California, Connecticut, Massachusetts, and Oregon.

Crucible furnaces.—Table 63 presents the statistics for crucible-furnace equipment, by states, for 1919 and 1914, with aggregate figures for the last four censuses.

TABLE 63.—STEEL FURNACES—CRUCIBLE, BY STATES: 1919 AND 1914.

[Ton, 2,240 pounds.]

STATE.	Census year.	Number of establish- ments.	Number of furnaces.	Number of pots.	Daily capac- ity tons of steel, double turn.
United States.....	1910	37	120	2,751	706
	1914	62	241	3,916	886
	1909	67	278	4,074	886
	1904	44	160	2,723	717
Pennsylvania.....	1919	20	59	1,838	490
	1914	26	97	2,358	579
New York.....	1919	8	26	532	139
	1914	6	24	508	127
New Jersey.....	1919	2	19	239	45
	1914	6	19	240	87
Illinois.....	1919	1	2	60	15
	1914	2	8	96	21
Michigan.....	1919	1	4	8	10
	1914	3	17	68	8
Massachusetts.....	1919	3	6	44	5
	1914	4	10	82	10
Indiana.....	1919	1	3	24	1
	1914	2	5	56	12
Rhode Island.....	1919	1	1	8	1
	1914	1	1	8	1
All other states <sup>1</sup> .....	1914	12	60	394	41

<sup>1</sup> All other states comprise: Delaware, Minnesota, Ohio, Tennessee, and Wisconsin.

Electric furnaces.—Table 64 in like manner presents the statistics for the electric furnaces installed in steel plants, by states, for 1919 and 1914.

TABLE 64.—STEEL FURNACES—ELECTRIC, BY STATES: 1919 AND 1914.

STATE.	Census year.	Number of establish- ments.	Number of furnaces.	Daily capacity, tons of steel, double turn.	STATE.	Census year.	Number of establish- ments.	Number of furnaces.	Daily capacity, tons of steel, double turn.
United States.....	1919	72	1 215	2,713	New Jersey.....	1919	3	7	93
	1914	15	2 <sup>1</sup> 15	438		1914	2	2	38
	1909	4	4	285	Indiana.....	1919	4	5	76
Pennsylvania.....	1919	28	45	695	California.....	1919	3	14	70
	1914	4	4	124		1914	1	1	3
Illinois.....	1919	4	10	455	Minnesota.....	1919	1	3	51
	1914	1	1	100	Massachusetts.....	1919	2	3	38
Ohio.....	1919	7	21	337		1914	1	1	83
	1914	1	1	26	Alabama.....	1919	1	5	30
New York.....	1919	7	22	309	Washington.....	1919	2	11	31
	1914	2	2	32	Virginia.....	1919	1	4	29
Wisconsin.....	1919	7	10	183	Iowa.....	1919	1	2	16
	1914	1	1	5	Connecticut.....	1919	1	4	16
Maryland.....	1919	1	6	120	Missouri.....	1919	1	2	6
Michigan.....	1919	3	17	126	All other states.....	1919	15	32	
	1914	1	1	25		1914	1	1	3

<sup>1</sup> Includes 99 Herault furnaces, 1,942 tons; 14 Snyder, 213 tons; 4 Moore, 79 tons; 3 Ludlum, 75 tons; 2 Pittsburgh, 50 tons; 1 each Gronwald-Dixon, Industrial, Booth-Hall, Gruener-Escholle, Rennerfelt, Girod, Webb, and Greene, with a total capacity of 138 tons; and 82 electric furnaces of 206 tons, in establishments not classified as "steel works and rolling mills."

<sup>2</sup> Includes 10 Herault furnaces, 422 tons; 3 Stassano, 9 tons; 1 Girod, 2 tons; and 1 Snyder, 5 tons.

<sup>3</sup> All other states comprise: Colorado, Georgia, Louisiana, Nebraska, Oklahoma, Oregon, Texas, and Utah.  
<sup>4</sup> District of Columbia.

Materials, products, and equipment, in detail, by states.—Detailed statistics for states are presented in Table 65 for 1919 with respect to materials and prod-

ucts. The detailed statistics for steel production, for remanufactures or fabrications, and for equipment, have been given in prior tables.

## MANUFACTURES.

TABLE 65.—MATERIALS AND PRODUCTS—DETAILED STATISTICS, BY STATES: 1919.

[Ton, 2,240 pounds.]

KIND AND STATE.	QUANTITY (TONS).			Cost.	KIND AND STATE.	QUANTITY (TONS).			Cost.			
	Total.	Produced by consumer (in other works).	Purchased.			Total.	Produced by consumer (in other works).	Purchased.				
<b>MATERIALS.</b>												
Total cost.....												
Alabama.....				\$1,680,575,758								
California.....				49,334,475								
Connecticut.....				9,508,535								
Delaware.....				4,241,854								
Illinois.....				3,861,615								
Indiana.....				100,319,478								
Kentucky.....				113,194,279								
Maryland.....				12,713,491								
Massachusetts.....				15,020,437								
Michigan.....				10,236,489								
Missouri.....				2,901,803								
New Jersey.....				5,600,622								
New York.....				34,326,805								
Ohio.....				54,816,314								
Pennsylvania.....				381,059,673								
West Virginia.....				777,472,690								
Wisconsin.....				50,794,491								
All other states.....				14,315,964								
				31,766,553								
<b>Iron and steel for furnaces and hot rolls.</b>												
Pig iron.....	23,919,958	21,170,130	2,749,822	581,517,335								
California.....	12,708		12,708	574,580								
Connecticut.....	23,745	(1)	(1)	749,323								
Delaware.....	50,606		50,606	1,484,437								
Illinois.....	2,287,038	2,090,153	197,485	55,419,583								
Indiana.....	2,109,215	2,057,837	51,378	46,466,403								
Kentucky.....	164,847	(1)	(1)	5,232,031								
Massachusetts.....	63,748		63,748	2,320,259								
Missouri.....	62,405		62,405	2,119,175								
New Jersey.....	89,193		89,193	3,716,113								
New York.....	900,198	(1)	(1)	20,393,617								
Ohio.....	5,784,072	5,171,519	612,553	137,971,046								
Pennsylvania.....	10,325,070	9,136,962	1,188,103	259,320,858								
West Virginia.....	284,851	(1)	(1)	7,453,903								
Wisconsin.....	8,711		8,711	395,691								
All other states.....	1,752,861	1,668,953	83,908	37,000,208								
<b>Ferro and other alloys:</b>												
Spiegeleisen and ferromanganese.....	347,095	123,353	223,742	41,479,431								
California.....	539		539	98,601								
Connecticut.....	451		451	31,271								
Delaware.....	1,037		1,037	205,818								
Illinois.....	24,245	(1)	(1)	3,294,723								
Indiana.....	25,629	(1)	(1)	2,932,089								
Massachusetts.....	1,905		1,905	278,465								
Michigan.....	550		550	123,437								
New Jersey.....	4,551		4,551	636,157								
New York.....	18,460	(1)	(1)	1,652,942								
Ohio.....	81,241	(1)	(1)	10,312,998								
Pennsylvania.....	156,716	66,215	90,501	18,023,539								
West Virginia.....	2,088		2,088	319,720								
Wisconsin.....	829		829	137,809								
All other states.....	28,854	10,440	18,405	3,431,864								
<b>Other ferro and nonferro alloys—</b>												
California.....	1,576		1,576	331,731								
Connecticut.....	147		147	14,469								
Delaware.....	217		217	12,220								
Illinois.....	7,037	(1)	(1)	2,076,635								
Indiana.....	10,002	(1)	(1)	1,268,590								
Massachusetts.....	627		627	61,140								
Michigan.....	496		496	75,197								
New Jersey.....	1,838	(1)	(1)	879,593								
New York.....	3,281		3,281	3,345,620								
Ohio.....	19,636	(1)	(1)	8,104,599								
Pennsylvania.....	44,015	4,400	39,525	14,805,325								
West Virginia.....	1,453		1,453	213,851								
Wisconsin.....	627		627	44,164								
All other states.....	4,889		4,889	769,220								
<b>Total consumption, including scrap made in the same works:</b>												
Scrap (including old rails not intended for rerolling).....	Tons.											
Alabama.....	10,369,210	7,026,082	1,480,260	5,545,822	145,133,051							
California.....	256,414	105,404	(1)	(1)	1,863,200							
Connecticut.....	256,230	217,333		217,333	4,833,322							
Delaware.....	51,181	36,958		636,058	871,390							
Illinois.....	62,476	28,551		28,551	560,717							
Indiana.....	1,033,328	511,100	91,870	419,290	10,387,892							
Kentucky.....	1,641,600	554,561	(1)	(1)	10,148,880							
Maryland.....	143,488	98,999		98,999	2,100,050							
Massachusetts.....	150,156	27,481		27,481	588,253							
Michigan.....	148,802	117,436	(1)	(1)	2,537,573							
Missouri.....	17,576	15,352		15,352	414,816							
New Jersey.....	45,604	36,847		36,847	926,735							
New York.....	166,726	119,139		119,139	3,023,938							
Ohio.....	595,874	170,881		170,881	4,769,350							
Pennsylvania.....	3,877,868	1,385,875	455,114	910,761	25,982,418							
West Virginia.....	7,725,558	8,223,525	863,833	2,360,195	68,166,998							
Wisconsin.....	107,133	65,357	(1)	(1)	1,307,214							
All other states.....	32,666	26,850		26,850	664,080							
	556,375	304,330	18,933	285,397	6,158,240							

<sup>1</sup> Included in total, but not shown.

## STEEL WORKS AND ROLLING MILLS.

TABLE 65.—MATERIALS AND PRODUCTS—DETAILED STATISTICS, BY STATES: 1919—Continued.

[Ton, 2,240 pounds.]

KIND AND STATE.	QUANTITY (TONS).			Value.	KIND AND STATE.	QUANTITY (TONS).			Value.
	Total.	For sale.	For consumption.			Total.	For sale.	For consumption.	
<b>PRODUCTS—continued.</b>									
I. Rolled, forged, and other classified steel and iron products	36,211,947	23,114,711	13,007,236	\$2,417,012,540	Iron and steel rods, total	2,878,403			\$164,522,314
Alabama	1,175,035	697,205	477,740	54,305,462	Illinois	358,397			17,492,833
California	183,525	144,507	39,018	14,404,044	New Jersey	113,549			9,247,298
Connecticut	50,097	(1)	(1)	7,133,473	New York	135,808			8,922,391
Delaware	72,591	(1)	(1)	6,503,950	Ohio	385,535			20,396,811
Illinois	2,610,461	1,867,787	742,674	157,026,544	Pennsylvania	1,282,495			75,514,122
Indiana	3,076,015	2,342,707	733,218	192,301,897	All other states	602,569			32,948,859
Kentucky	261,170	(1)	(1)	16,836,019	Wire rods ready to be drawn or rolled into wire, total	2,484,428	582,273	1,902,155	126,738,142
Maryland	230,223	(1)	(1)	15,050,237	Illinois	319,581	(1)	(1)	15,153,290
Massachusetts	212,169	(1)	(1)	13,507,136	Pennsylvania	1,048,478	231,195	817,283	54,876,918
Michigan	20,327	(1)	(1)	5,356,637	All other states	1,116,363	(1)	(1)	56,707,934
Missouri	117,530	(1)	(1)	11,113,306	Cold-rolled, cold-drawn, cold-hammered, or polished, total	145,607	141,986	3,711	17,682,981
New Jersey	208,727	(1)	(1)	31,952,787	Pennsylvania	111,387	109,559	1,828	10,980,134
New York	1,075,069	689,618	86,351	92,243,134	All other states	34,310	72,427	1,883	6,692,847
Ohio	8,950,138	4,676,176	4,279,950	Rolled wire rods in coils or bars of crucible or electric steel, total	15,355	11,044	4,314	4,767,443	
Pennsylvania	10,135,637	10,537,811	5,597,726	Bolt and nut rods, etc., total	182,445	10,443	151,908	12,449,618	
West Virginia	829,173	227,890	601,277	New York	111,804	(1)	(1)	1,266,684	
Wisconsin	214,204	214,204		Pennsylvania	87,746	(1)	(1)	6,578,012	
All other states	753,450	593,790	150,686	All other states	62,835	(1)	(1)	4,664,942	
A. Finished rolled products and forging, total	25,512,847	17,343,747	8,160,100	Spike, chain and horseshoe nail rods, total	70,475			2,884,130	
Alabama	689,109	546,710	142,309	Pennsylvania	30,994			1,230,760	
California	144,490	105,472	39,018	All other states	30,481			1,644,370	
Connecticut	47,161	(1)	(1)	Plates (No. 12 and thicker, not coated):	68,434			4,951,617	
Delaware	64,148	(1)	(1)	Crucible plate steel, total	2,107			427,438	
Illinois	1,050,308	1,314,204	330,104	Pennsylvania	66,267			4,524,179	
Indiana	2,657,267	2,005,756	561,511	All other states	8,508			3,501,306	
Kentucky	80,290	(1)	(1)	Saw plates, total	4,669			1,997,453	
Maryland	198,872	(1)	(1)	Pennsylvania	3,899			1,563,013	
Massachusetts	187,636	(1)	(1)	All other states	Boiler or other plate, total	4,349,998	3,723,003	620,393	287,411,042
Michigan	2,077	(1)	(1)	California	30,984			1,528,751	
Missouri	89,057	(1)	(1)	Indiana	485,366	(1)	(1)	32,605,230	
New Jersey	180,472	(1)	(1)	Ohio	584,003	578,222	4,781	38,083,045	
New York	936,785	850,510	88,275	Pennsylvania	2,599,517	2,172,310	427,207	160,714,788	
Ohio	4,984,114	2,790,559	2,193,555	All other states	670,126	(1)	(1)	45,419,228	
Pennsylvania	12,143,217	8,330,740	3,812,477	Sheets (No. 13 and thinner) black or common:	2,293,193	1,454,734	838,459	227,697,398	
West Virginia	685,529	191,781	409,748	Plain, total	218,330	(1)	(1)	20,801,246	
All other states	772,315	(1)	(1)	Indiana	1,001,593	649,192	442,401	105,023,855	
Rails:				Pennsylvania	724,101	(1)		75,432,503	
Open-hearth steel, total	1,893,141			West Virginia	101,221	55,584	45,637	10,357,761	
Pennsylvania	413,507			All other states	157,858	(1)	(1)	16,082,084	
All other states	1,479,634			Black for tinning, total	1,084,175	7,107	1,077,068	94,456,189	
Bessemer total	105,937			Ohio	190,094	(1)	(1)	16,713,092	
Rerolled or renewed rails, total	95,637			Pennsylvania	497,069	1,096	495,973	43,418,357	
Rail joints and fastenings, tie-plates, fishplates, etc., total	402,601			West Virginia	253,343	(1)	(1)	21,965,066	
Pennsylvania	127,013			All other states	143,380	(1)	(1)	12,359,074	
All other states	334,778			Skelp, total	2,589,064	379,271	2,209,793	151,557,342	
Structural shapes, total	2,520,401			Ohio	1,281,747	176,014	1,105,783	74,902,772	
(3" over, leg or web) heavy	2,200,820			Pennsylvania	993,926	166,387	827,039	59,180,392	
(Less than 3", leg or web) light	319,041			West Virginia	188,130	(1)	(1)	10,043,185	
Pennsylvania	1,705,087			All other states	125,201	(1)	(1)	7,477,993	
All other states	730,774			Cotton ties, total	42,681			3,509,492	
Steel bars (merchant, mill shafting, etc., other than reinforced concrete), total	4,020,448	3,654,217	372,231	Hoops, bands, and strips:	595,920			46,902,829	
Illinois	233,645	(1)	(1)	Hoop, band or scroll, black, total	326,987			25,115,678	
Indiana	450,300	(1)	(1)	All other states	268,983			21,787,151	
New Jersey	33,090	(1)	(1)	Steel in strips, flat wire (not exceeding 5" in width or No. 15 wire gauge), total	87,002	53,772	33,230	8,767,817	
New York	205,778	(1)	(1)	Pennsylvania	24,322	(1)	(1)	2,588,287	
Ohio	1,057,578	906,001	88,487	All other states	62,680	(1)	(1)	6,171,530	
Pennsylvania	1,630,700	1,401,408	169,201	Other strips:	106,609	87,804	18,805	10,685,192	
All other states	318,343			Nail and tack plate, total	14,337			1,181,535	
Open-hearth or Bessemer	3,883,020			Axles, rolled or forged:	86,247			9,435,199	
Indiana	459,300			Car and locomotive, total	72,408			7,061,415	
New York	232,374			Pennsylvania	23,779			2,373,784	
Pennsylvania	1,011,120			All other states	1,566			317,774	
All other states	1,582,225			Car and locomotive wheels, rolled or forged, total	117,763			17,044,728	
Crucible steel	567,095			Pennsylvania	108,997			15,565,085	
New York	33,411			All other states	8,766			1,470,043	
Pennsylvania	12,300			Armor plate and ordnance (gun forgings, shells, projectiles, etc.), total	101,130			55,699,658	
All other states	16,592			Pennsylvania	68,964			44,401,072	
Electric steel	4,513			All other states	32,166			11,208,588	
New York	110,008			787,475	237,916	549,559	75,680,987		
Pennsylvania	21,098			Illinois	62,329	(1)	(1)	5,770,707	
All other states	31,982			Indiana	15,253			2,044,568	
Iron bars, including merchant bars (other than reinforced concrete), total	56,028			New York	10,724	(1)	(1)	924,489	
Illinois	458,549	430,233	22,316	Ohio	19,705	14,752	4,953	2,220,435	
Indiana	25,401	(1)	(1)	Pennsylvania	682,335	148,616	513,719	62,290,241	
New Jersey	141,105	(1)	(1)	All other states	17,129	(1)	(1)	2,430,647	
New York	18,150	18,150		Included in total, but not shown.					
Pennsylvania	0,243	9,243							
All other states	140,453	130,010	9,840						
Reinforced concrete bars:	124,131	(1)	(1)						
Steel, total	240,088								
California	30,037								
Indiana	44,464								
Pennsylvania	49,460								
All other states	110,118								
Iron, total	52,308								
Pennsylvania	34,658								
All other states	17,707								

1 Included in total, but not shown.

## MANUFACTURES.

TABLE 65.—MATERIALS AND PRODUCTS—DETAILED STATISTICS, BY STATES: 1919—Continued.

[Ton, 2,240 pounds.]

KIND AND STATE.	QUANTITY (TONS),			Value.	KIND AND STATE.	Total	Made and consumed in same works.	For sale or transfer to other establishments.
	Total.	For sale.	For consumption.				Tons.	Tons.
<b>PRODUCTS—continued.</b>								
C.—Unrolled steel:								
Ingots, total.....	713,027			\$33,315,197	Hammered charcoal blooms, billets, and slabs, total.....	51,477	33,692	17,785
Illinois.....	181,306			9,371,449	Pennsylvania.....	41,057	31,342	9,715
Ohio.....	92,849			3,049,795	All other states.....	10,420	2,350	8,070
Pennsylvania.....	243,150			10,102,572	Sheet and tin-plate bars, total.....	4,154,429	1,280,851	2,804,578
All other states.....	195,062			10,791,381	Ohio.....	1,635,065	436,876	1,258,189
D.—Ingot steel castings, total.....	720,143			134,644,005	Pennsylvania.....	1,556,620	457,498	1,009,122
California.....	19,863			3,391,891	All other states.....	902,744	395,477	507,267
Illinois.....	79,130			14,081,129	Muck and scrap bar, total.....	906,499	733,509	172,990
Indiana.....	45,520			8,392,932	Illinois.....	34,775	34,775	
Michigan.....	18,218			5,046,375	Indiana.....	135,054	135,054	
New Jersey.....	16,104			5,588,046	New Jersey.....	37,075	37,075	
New York.....	31,509			5,420,280	New York.....	25,769	25,769	
Ohio.....	127,715			22,343,371	Ohio.....	66,958	66,958	
Pennsylvania.....	270,034			47,144,627	Pennsylvania.....	452,881	203,425	159,450
All other states.....	112,050			23,257,354	All other states.....	155,987	140,433	13,584
B.—Semifinished rolled product, total.....	9,265,930				II. Scrap iron or steel, total.....	11,457,773	0,343,128	2,114,045
Illinois.....	699,657				Alabama.....	(1)	(1)	146,858
Indiana.....	378,228				California.....	38,897	38,897	2,536,857
Kentucky.....	159,138				Delaware.....	(1)	(1)	2,293
New York.....	102,893				Illinois.....	628,134	522,168	105,966
Ohio.....	3,751,400				Indiana.....	1,186,520	1,087,089	99,427
Pennsylvania.....	3,478,636				Kentucky.....	(1)	44,489	(1)
All other states.....	700,918				Massachusetts.....	(1)	(1)	2,267
Blooms, billets and slabs, steel, total.....	25,368,210	19,344,166	6,024,044		Michigan.....	(1)	(1)	47,230
Illinois.....	1,727,160	1,310,527	410,633		Missouri.....	8,757	8,757	51,087
Indiana.....	2,033,352	1,744,885	288,467		New Jersey.....	4,471,587	(1)	(1)
Kentucky.....	134,975	44,875	90,100		New York.....	443,829	425,013	18,816
New York.....	6,411,119	3,903,356	2,447,763		Ohio.....	2,535,468	2,011,993	523,475
Ohio.....	11,491,537	9,312,280	2,178,257		Pennsylvania.....	5,599,265	4,502,030	1,007,235
Pennsylvania.....	2,714,009	2,150,541	564,068		West Virginia.....	121,795	41,781	80,014
All other states.....					Wisconsin.....	(1)	5,810	(1)
Rolled blooms and billets for forging, total.....	310,854	124,321	186,533	10,669,833	All other states.....	(1)	(1)	(1)
Illinois.....	31,771		31,771		IV. All other products, other than steel or iron.....			\$22,265,923
Ohio.....	(1)		45,508	2,574,157	Illinois.....	7,285,026		222,024
Pennsylvania.....	110,007		78,921	31,986	Indiana.....	1,334,324		404,184
All other states.....	(1)		(1)	1,775,887	Maryland.....	2,000,932		455,850
				4,100,073	Connecticut.....	14,005,849		62,113
					Illinois.....	4,685,103		31,951
					Kentucky.....	1,253,075		3,721,905
					Massachusetts.....	17,238,441		14,802,023
					New Jersey.....	2,204,271		185,960
					Michigan.....	1,423,701		2,107,557
					Missouri.....	42,367,881		Custom work and repairing.....
					New Jersey.....	7,760,900		6,307,289
					Ohio.....	58,243,302		Michigan.....
					Pennsylvania.....	144,129,876		554,350
					West Virginia.....	21,277,842		1,608,775
					All other states.....	18,487,483		2,937,732
								1,206,432

<sup>1</sup> Included in total, but not shown.

## GENERAL TABLES.

Comparative summary, by states.—Table 66 shows, by states, for 1919, 1914, and 1909 the number of establishments, average number of wage earners, primary horse-

power, wages, cost of materials, and value of products.

Detailed statement, by states.—Table 67 gives, for 1919, the detailed statistics of the industry, by states.

TABLE 66.—COMPARATIVE STATISTICS, BY STATES: 1919, 1914, AND 1909.

STATE.	Cen-sus year.	Num-ber of estab-lish-ments	Wage earners (aver-age num-ber).	Primary horse-power.	Wages.	Cost of mate-rials.	Value of prod-ucts.	STATE.	Cen-sus year.	Num-ber of estab-lish-ments	Wage earners (aver-age num-ber).	Primary horse-power.	Wages.	Cost of mate-rials.	Value of prod-ucts.		
Expressed in thousands.								Expressed in thousands.									
United States.....	1919	500	375,088	8,820,917	\$637,637	\$1,680,576	\$2,828,902	Missouri.....	1919	5	2,047	7,426	\$8,045	\$5,601	\$12,537		
	1914	427	248,716	2,706,552	188,142	590,526	918,665		1914	3	1,237	7,062	954	1,887	3,383		
	1909	446	240,076	2,100,978	163,201	657,501	985,723		1900	4	2,227	6,255	1,320	2,850	5,013		
California.....	1919	8	3,476	22,938	6,359	9,509	18,192	New Jersey.....	1919	18	13,811	81,600	17,085	34,327	74,382		
	1914	7	1,244	6,833	1,050	2,673	4,214		1914	15	1,186	30,971	2,969	5,185	10,420		
	1909	5	1,038	3,945	829	2,348	3,520		1909	16	4,671	29,689	2,823	6,635	12,014		
Delaware.....	1919	6	1,009	13,442	1,527	3,982	7,115	New York.....	1919	30	17,901	242,352	28,837	54,810	100,593		
	1914	5	818	3,545	454	932	1,669		1914	24	10,788	140,402	7,664	18,217	32,078		
	1909	5	710	4,912	1,059	1,059	1,715		1900	25	10,091	136,456	6,323	25,889	39,532		
Illinois.....	1919	32	20,177	242,227	34,064	100,319	173,345	Ohio.....	1919	86	73,025	865,036	187,281	381,060	626,370		
	1914	25	15,408	173,709	12,368	39,938	64,995		1914	70	46,397	642,004	38,004	139,676	205,023		
	1909	24	17,584	152,470	12,962	56,244	86,608		1909	75	38,586	516,813	28,614	139,243	197,780		
Indiana.....	1919	23	22,362	278,832	41,294	113,194	199,273	Pennsylvania.....	1919	198	171,715	1,521,731	298,725	777,473	1,299,412		
	1914	19	11,106	89,724	9,620	37,057	58,883		1914	178	131,955	1,270,642	96,926	285,382	448,106		
	1909	17	12,255	111,806	8,390	26,009	38,032		1900	189	126,911	896,440	85,113	329,013	500,344		
Kentucky.....	1919	5	1,892	41,539	2,682	12,714	18,319	West Virginia.....	1919	20	11,030	80,231	19,993	50,794	85,026		
	1914	6	1,987	34,405	1,279	7,155	9,078		1914	15	5,348	63,002	4,826	14,658	21,188		
	1909	7	2,372	28,640	1,278	5,561	7,779		1909	16	5,060	46,508	3,837	15,896	22,435		
Massachusetts.....	1919	11	3,684	31,604	5,765	19,226	30,970	Wisconsin.....	1919	12	3,929	27,433	4,329	14,340	28,393		
	1914	11	2,889	28,507	8,003	8,802	11,376		1914	12	2,029	1,293	1,293	6,009	10,733		
	1909	9	3,115	24,500	1,977	10,032	18,508		1909	14	2,124	10,064	1,409	7,906	10,733		
Michigan.....	1919	7	1,455	9,142	2,471	2,902	8,345	All other states.....	1919	41	26,375	355,484	33,287	100,363	149,620		
	1914	9	718	4,688	498	871	1,716		1914	28	12,153	175,830	7,725	24,838	40,549		
	1909	8	1,183	4,290	661	1,598	2,070		1909	32	12,149	128,180	7,204	27,119	43,360		

# STEEL WORKS AND ROLLING MILLS.

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TABLE 67.—DETAILED STATEMENT, BY STATES: 1919.

STATE.	Number of establishments	PERSONS ENGAGED IN THE INDUSTRY.							WAGE EARNERS DEC. 15, OR NEAREST REPRESENTATIVE DAY.						EXPENSES.				
		Total.	Proprietors and firm members.	Salaried officers, superintendents, and managers.		Clerks, etc.		Wage earners.		16 and over.		Under 16.		Salaries and wages.		Capital.	Officials.	Clerks, etc.	
				Male.	Female.	Average number.		Number, 15th day of—	Maximum month.	Minimum month.	Total.	Male.	Female.	Male.	Female.				
United States.	500	121,861	35	9,071	28,304	8,703	375,088	Ja 441,560	Oc 220,400	400,620	396,741	3,695	171	13	2,656,518,417	Dollars.	43,564,403	Dollars.	50,316,012
Alabama.	9	9,205	.....	230	686	108	8,121	Jn 8,505	Je 7,720	7,983	7,970	7	.....	.....	66,600,582	945,919	1,124,678		
California.	8	3,758	.....	91	149	42	8,476	Oc 3,746	Je 3,309	3,462	3,429	22	1	.....	13,700,484	394,369	360,137		
Connecticut.	7	2,718	.....	66	102	82	2,468	Ja 2,824	Au 2,182	2,713	2,624	72	10	7	13,532,207	295,915	294,421		
Delaware.	6	1,184	.....	60	81	34	1,009	Ja 1,740	Je 504	1,200	1,209	.....	.....	.....	13,454,780	222,093	128,442		
Illinois.	32	23,483	.....	935	1,873	408	20,177	Fo 25,795	Oc 13,330	21,706	21,576	124	6	.....	156,775,176	3,709,826	3,041,425		
Indiana.	23	24,988	.....	502	1,553	511	22,362	Ja 26,083	Oc 16,689	23,719	23,668	49	2	.....	184,292,931	2,332,793	3,708,845		
Kentucky.	5	2,083	.....	79	96	10	1,892	De 2,612	Se 862	2,727	2,725	2	.....	.....	18,315,982	284,161	101,003		
Maryland.	5	5,179	.....	79	124	32	4,944	Fo 5,725	My 4,021	5,443	5,360	83	.....	.....	41,734,218	458,401	636,398		
Massachusetts.	11	4,310	1	204	300	115	3,084	De 4,029	Ap 3,221	3,996	3,831	161	4	.....	21,374,408	605,430	657,183		
Michigan.	7	1,675	.....	68	118	34	1,455	No 1,075	My 1,110	1,454	1,450	4	.....	.....	10,081,631	311,913	268,358		
Missouri.	5	2,916	.....	124	94	51	2,647	Fo 3,253	No 2,170	2,484	2,374	91	2	.....	15,113,018	390,627	161,785		
New Jersey.	16	17,142	1	238	2,265	827	13,811	Ja 14,473	Jy 13,351	13,804	13,473	411	10	.....	97,510,778	1,311,324	2,515,915		
New York.	30	20,366	3	533	1,385	544	17,001	Ja 22,502	Oc 13,391	19,148	18,858	282	8	.....	145,784,654	2,790,243	2,175,879		
Ohio.	86	80,494	3	1,395	4,618	1,453	73,025	Ja 85,394	Oc 41,747	82,678	81,067	1,010	1	.....	511,271,910	6,504,739	9,988,611		
Pennsylvania.	188	103,450	25	4,167	13,532	4,011	171,715	Ja 202,630	Oc 145,252	179,308	177,975	1,225	104	4	1,184,203,482	19,478,800	27,390,578		
West Virginia.	20	12,730	.....	306	513	101	11,630	Se 13,210	Oc 7,920	12,694	12,550	144	.....	.....	63,207,124	1,470,026	1,233,428		
Wisconsin.	12	4,337	.....	130	231	47	3,920	Fo 4,794	My 3,381	4,203	4,102	3	8	.....	27,205,644	705,496	483,349		
All other states.	20	11,843	2	344	548	107	10,842	.....	.....	11,809	11,804	5	.....	.....	78,299,428	1,292,167	1,087,581		

STATE.	EXPENSES—continued.							POWER.						Electric horsepower generated in establishments reporting.			
	Salaries and wages—Continued.	Rent and taxes.			For materials.			Value added by manufacturer.	Primary horsepower.					Electric horsepower generated in establishments reporting.			
		For contract work.	Rent of factory.	Taxes, Federal, state, county, and local.	Principal materials.	Fuel and rent of power.	Total.	Steam engines (including turbines).	Internal-combustion engines.	Water power. <sup>a</sup>	Electric (rented). <sup>b</sup>	Total.	Steam engines (including turbines).	Internal-combustion engines.	Water power. <sup>a</sup>	Electric (rented). <sup>b</sup>	
United States.	Dollars. 637,037,430	Dollars. 2,963,416	Dollars. 305,434	Dollars. 87,700,777	Dollars. 1,523,610,896	Dollars. 160,964,802	Dollars. 2,628,902,376	Dollars. 1,148,320,018	Dollars. 3,820,917	Dollars. 2,856,556	257,473	9,041	697,847	Dollars. 1,655,499	Dollars. 1,655,499	Dollars. 1,655,499	Dollars. 1,655,499
Alabama.	9,331,013	.....	12,000	636,207	43,250,090	8,075,885	64,980,154	15,616,679	150,030	87,480	35	.....	62,515	18,845	18,845	18,845	18,845
California.	6,358,704	0,332	251,548	8,145,802	1,362,873	18,101,989	8,683,454	22,388	3,381	.....	.....	.....	19,457	.....	.....	.....	.....
Connecticut.	3,097,900	.....	1,715	200,254	3,450,281	785,573	9,583,036	5,341,182	14,600	12,704	.....	.....	2,186	4,724	4,724	4,724	4,724
Delaware.	1,520,849	.....	179,469	3,265,120	506,480	7,113,083	3,263,408	13,442	12,967	.....	.....	4,75	6,557	6,557	6,557	6,557	
Illinois.	34,903,671	4,637	11,833	11,730,250	89,840,859	10,478,610	173,344,650	73,025,172	242,227	190,407	24,025	.....	27,795	132,335	132,335	132,335	132,335
Indiana.	41,293,690	314	31,615	13,820,978	99,222,769	13,971,510	100,273,518	80,079,239	278,832	115,641	113,910	.....	40,281	61,252	61,252	61,252	61,252
Kentucky.	2,081,861	1,000	2,500	260,330	11,681,488	1,032,208	18,318,600	5,604,999	41,539	33,800	.....	.....	8,239	4,451	4,451	4,451	4,451
Maryland.	5,429,730	.....	11,345	154,201	13,510,005	1,473,532	19,884,154	4,883,717	47,426	18,030	26,000	.....	2,796	105,078	105,078	105,078	105,078
Massachusetts.	5,767,024	650	17,383	752,870	17,232,481	2,004,008	30,069,061	11,733,112	32,609	20,995	667	425	9,522	7,285	7,285	7,285	7,285
Michigan.	2,471,038	.....	12,000	641,542	2,303,307	508,496	8,344,043	5,442,840	9,142	2,710	.....	.....	6,432	4,405	4,405	4,405	4,405
Missouri.	3,044,616	50,000	1,001	5,101,207	559,415	12,537,007	6,876,445	7,426	4,600	20	510	2,826	6,730	6,730	6,730	6,730	
New Jersey.	17,085,061	325,319	5,000	2,067,084	30,404,200	3,022,605	74,382,205	40,055,400	81,600	62,445	20	510	18,025	22,913	22,913	22,913	22,913
New York.	28,837,249	0,582	12,300	3,150,231	47,413,047	7,403,207	100,502,636	45,770,322	125,282	8,870	373	109,827	7,743	7,743	7,743	7,743	7,743
Ohio.	137,231,312	2,201,800	8,600	17,895,874	352,138,066	23,020,707	620,370,025	245,310,352	885,036	672,822	20,651	.....	171,503	285,988	285,988	285,988	285,988
Pennsylvania.	298,725,262	356,221	158,002	24,022,470	708,566,395	68,906,295	1,206,412,070	518,039,380	1,521,731	1,327,903	46,860	70	146,898	899,922	899,922	899,922	899,922
West Virginia.	19,003,057	.....	3,513,424	47,569,042	3,224,530	85,036,489	34,242,008	80,231	67,592	630	1,333	10,676	41,366	41,366	41,366	41,366	
Wisconsin.	4,328,771	10,000	2,201	4,420,118	13,923,176	1,392,788	28,393,331	14,047,367	27,433	16,125	670	.....	10,638	6,910	6,910	6,910	6,910
All other states.	15,429,303	.....	17,104	1,471,198	27,349,097	4,410,550	55,173,035	23,406,482	143,133	81,572	17,135	6,330	33,096	42,395	42,395	42,395	42,395

<sup>1</sup> All other states embrace: Colorado, 1 establishment; District of Columbia, 1; Georgia, 1; Iowa, 2; Maine, 1; Minnesota, 2; Oregon, 1; Rhode Island, 3; Tennessee, 1;

Texas, 1; Utah, 1; Virginia, 2; and Washington, 3.

<sup>2</sup> Includes water wheels and turbines (irrespective of ownership of water supply), and water motors (operated by water from city mains).

<sup>3</sup> Chiefly electric motors operated by rented (or purchased) current; other power included (chiefly shaft-belt or transmitted power from neighboring power plants.)

## TIN PLATE AND TERNEPLATE.

### GENERAL STATISTICS.

**General character of the industry.**—This industry involves the rolling of the black plates and coating with tin or terne mixture, terne mixture being an alloy of tin and lead, the proportion of tin varying from 20 to 25 per cent. The manufacture of the black plates is a rolling-mill operation and most of the coating is done in dipping departments of the mills that roll the plates. At prior censuses, segregated reports were received for the dipping departments of the black-plate rolling mills and these were included along with the reports from the independent tin-plate establishments, and collectively they constituted the tin-plate and terneplate classified industry. At the present census no attempt was made to secure a segregated report for the dipping department of a rolling mill, and the general statistics for the industry here presented refer to the independent mills only and are, therefore, not fully comparable with those for previous censuses. The statistics for specific materials and products, however, are comprehensive for the industry and cover materials and products, irrespective of whether the establishment is a department of a rolling mill and included in the statistics for steel works and rolling mills, or an independent establishment. The present census, however, includes 8 establishments engaged in recoating tinned ware, with products classed as custom work, valued at \$57,536.

**Comparative summary.**—Table 68 summarizes the general statistics for the industry for the census years 1899 to 1919, inclusive, with percentages of increase for the earlier census periods. The percentages of increase are omitted for the period 1914–1919 because of the limitation of the scope of the 1919 census.

**Principal states, ranked by value of products.**—Table 69 gives the general statistics, by states, ranked according to value of products.

**Persons engaged in the industry.**—Table 70 presents the comparative statistics for 1919, 1914, and 1909 for persons engaged in the industry, classified as to their occupational status, sex, and whether over or under 16 years of age. The age classification of the average number of wage earners is an estimate obtained by the method described in the "Explanation of terms."

**Wage earners, by months.**—Table 71 gives the statistics of wage earners, by months, for 1919, 1914, and

1909. Females constituted 13.1 per cent of the total number in 1919. The table affords a view of the fluctuations during the year.

**Prevailing hours of labor.**—Table 72 illustrates the tendency towards shortening the hours of labor. In 1909, 13.6 per cent were in establishments where the prevailing hours of labor per week were 48 or less; in 1914 this proportion increased to 41.8 per cent, and in 1919 to 84.6 per cent. On the other hand, in 1909 33.3 per cent of the wage earners were in establishments where the prevailing hours of labor were in excess of 54 per week, but in 1914 only 7.3 per cent were in establishments of this class, and in 1919 the proportion was reduced still further to 4.8 per cent.

**Size of establishments, by average number of wage earners (Table 73).**—In 1919 the establishments averaged 130 wage earners per establishment, and in 1914, 169; with 35.8 per cent of all wage earners in establishments averaging over 250 wage earners in 1919 and 45.4 per cent in 1914.

**Size of establishments, by value of products.**—A classification based upon value of products is necessarily affected by the high values in 1919. Moreover, the change in the scope of the industry affects comparisons with the census of 1914 and prior years. The establishments averaged \$1,547,000 in value of products at the census of 1909, \$2,205,000 at the census of 1914, and \$4,058,000 at the census of 1919. For 1909, 18 of the 31 establishments reported products in excess of \$1,000,000, aggregating \$42,171,000, or 87.9 per cent of all products for the industry; at the census of 1914, there were 23 similar establishments, with 96.1 per cent of all products; and at the census of 1919, 15, with 99.5 per cent.

**Character of ownership.**—With a few exceptions, the establishments are owned by corporations. Of the 24 establishments in 1919, 16 were corporations with 99.9 per cent of the value of products, and employing 98.9 per cent of the wage earners. The remaining establishments, 8 in number, include 7 individuals and 1 firm, and include the redipping or retinning plants.

**Number and horsepower of types of prime movers.**—Table 74 presents the power equipment statistics for 1919, 1914, and 1909.

**Fuel consumed.**—Table 75 presents the statistics for fuel consumption.

# TIN PLAT AND TERNEPLATE.

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TABLE 68.—COMPARATIVE SUMMARY: 1919, 1914, 1909, 1904, AND 1899.

	1919 <sup>1</sup>	1914	1909	1904	1899	PER CENT OF INCREASE, <sup>2</sup>		
						1909-1914	1904-1909	1899-1904
Number of establishments.....	23	31	31	36	57			
Persons engaged.....	3,086	5,733	5,846	5,132	4,019	-1.9	13.0	27.7
Proprietors and firm members.....	9	4	4	1	15			
Salaried employees.....	555	491	490	284	333			
Wage earners (average number).....	3,122	5,238	5,352	4,847	3,071	-2.1	72.5	-1.7
Primary horsepower.....	18,607	9,355	8,154	8,900	3,515	14.7	-9.3	155.8
Capital.....	\$31,315,000	\$26,847,880	\$10,094,813	\$10,813,239	\$6,650,047	144.2	1.7	62.6
Salaries and wages.....	6,028,403	4,683,117	3,934,794	2,692,624	2,181,240	19.0	46.2	23.4
Salaries.....	1,171,986	758,670	619,920	309,554	201,323	22.4	100.3	6.3
Wages.....	5,750,417	3,024,447	3,314,874	2,383,070	1,889,017	18.	39.1	26.1
Paid for contract work.....	207							
Rent and taxes.....	1,863,352	141,787	54,620	30,882	33,271	159.6	76.9	-9.9
Cost of materials.....	73,422,640	57,906,561	41,880,434	31,375,714	26,728,150	38.2	33.5	17.0
Value of products.....	97,404,720	68,342,062	47,969,045	35,283,360	31,892,011	42.5	36.0	10.6
Value added by manufacture <sup>3</sup> .....	23,982,071	10,436,401	6,080,211	3,907,646	5,163,861	71.6	55.6	-24.3

<sup>1</sup> Figures not comparable with prior years, which include dipping departments of rolling mills as well as mills operating independently, while 1919 figures are for the latter class only; hence per cent of increase, 1914-1910, is omitted.

<sup>2</sup> A minus sign (-) denotes decrease.

<sup>3</sup> Exclusive of internal revenue.

<sup>4</sup> Value of products less cost of materials.

TABLE 69.—PRINCIPAL STATES, RANKED BY VALUE OF PRODUCTS: 1919.

STATE.	Num- ber of estab- lish- ments.	WAGE EARNERS.			VALUE OF PRODUCTS.			VALUE ADDED BY MANUFACTURE.		
		Average number.	Per cent distribu- tion.	Rank.	Amount (expressed in thousands).	Per cent distribution	Rank.	Amount (expressed in thousands).	Per cent distribution	Rank.
United States.....	24	3,122	100.0	.....	\$97,405	100.0	.....	\$23,982	100.0	.....
Pennsylvania.....	11	2,005	64.2	1	58,816	60.4	1	14,001	58.6	1
Ohio.....	3	263	8.4	4	9,197	9.4	4	2,523	10.5	4
All other states.....	10	854	27.4	.....	29,392	30.2	.....	7,308	30.9	.....

TABLE 70.—PERSONS ENGAGED IN THE INDUSTRY: 1919, 1914, AND 1909.

CLASS.	Cen- sus year.	Total.	Male.	Fe- male.	PER CENT OF TOTAL.		CLASS.	Cen- sus year.	Total.	Male.	Fe- male.	PER CENT OF TOTAL.	
					Male.	Fe- male.						Male.	Fe- male.
All classes.....	1919	3,086	3,067	019	83.2	16.8	Clerks and other subordinate salaried employees.....	1919	208	173	35	83.2	16.8
	1914	5,723	5,030	694	87.9	12.1		1914	403	330	73	81.0	18.1
	1909	5,846	5,275	571	90.2	9.8		1909	396	320	76	80.8	19.2
Proprietors and officials.....	1919	350	181	175	50.0	49.1	Wage earners (average number).....	1919	3,122	2,713	409	80.9	13.1
	1914	92	92	.....	100.0	.....		1914	5,238	4,617	621	88.1	11.9
	1909	98	98	.....	100.0	.....		1909	5,352	4,857	495	90.8	9.2
Proprietors and firm members.....	1919	0	9	.....	100.0	.....	16 years of age and over.....	1919	3,118	2,700	409	80.8	13.2
	1914	4	4	.....	100.0	.....		1914	5,219	4,508	621	88.1	11.9
	1909	4	4	.....	100.0	.....		1909	5,322	4,827	405	90.7	9.3
Salaried officers of corporations.....	1919	0	0	.....	100.0	.....	Under 16 years of age.....	1919	4	4	.....	100.0	.....
	1914	24	24	.....	100.0	.....		1914	19	19	.....	100.0	.....
	1909	20	20	.....	100.0	.....		1909	30	30	.....	100.0	.....
Superintendents and managers.....	1919	338	163	175	48.2	51.8							
	1914	64	64	.....	100.0	.....							
	1909	74	74	.....	100.0	.....							

## MANUFACTURES.

TABLE 71.—WAGE EARNERS, BY MONTHS, FOR STATES: 1919.

[The month of maximum employment is indicated by bold-faced figures and that of minimum employment by *italic* figures.]

STATE.	Average number employed during year.	NUMBER EMPLOYED ON 15TH DAY OF THE MONTH OR NEAREST REPRESENTATIVE DAY.												Per cent minimum is of maximum.
		January.	Februa-	March.	April.	May.	June.	July.	August.	Septem-	Octo-	Novem-	Decem-	
United States:														
1919.....	3,122	3,487	3,880	3,641	2,810	2,606	2,367	3,442	3,607	3,008	2,471	2,859	3,286	61.0
Males.....	2,713	3,041	3,370	3,166	2,445	2,285	2,105	3,001	3,119	2,588	2,114	2,470	2,943	62.5
Females.....	409	446	510	475	365	321	262	441	488	357	380	449	53.7	
1914.....	5,238	5,222	5,277	5,636	5,702	5,591	5,580	5,448	4,943	5,427	5,526	4,300	4,154	72.0
1909.....	5,352	4,924	5,187	5,215	5,568	5,621	5,775	4,771	5,079	5,215	5,404	5,692	5,680	82.6
Ohio.....	263	363	392	385	202	312	288	352	440	206	25	45	146	5.7
Pennsylvania.....	2,005	2,196	2,454	2,334	1,851	1,492	1,550	2,134	2,255	1,902	1,083	1,965	2,244	60.3

TABLE 72.—AVERAGE NUMBER OF WAGE EARNERS, BY PREVAILING HOURS OF LABOR PER WEEK, FOR STATES: 1919 AND 1914.

STATE.	Cen-	Total.	IN ESTABLISHMENTS WHERE THE PREVAILING HOURS OF LABOR PER WEEK WERE—						STATE.	Cen-	Total.	IN ESTABLISHMENTS WHERE THE PREVAILING HOURS OF LABOR PER WEEK WERE—						
			44 and under.	Be-	Be-	Be-	Be-	Be-				44 and under.	Be-	Be-	Be-	Be-	Be-	
United States.....	1910	3,122	2,640	(2)	2,190	9	323	134	16	Pennsylvania.....	1919	2,005	1,584	(2)	9	323	86	3
	1914	5,238	(2)	(2)	729	7	2,657	378	6		1914	2,308	039	(2)	7	1,722	.....	
Ohio.....	1919	263	250	(2)	408	.....	361	88	13									
	1914	953	(2)	(2)	.....		.....	.....	6									

<sup>1</sup> Includes 48 and under for 1914 and 1909.<sup>2</sup> Corresponding figures not available.

TABLE 73.—SIZE OF ESTABLISHMENTS, BY AVERAGE NUMBER OF WAGE EARNERS, FOR STATES: 1919.

STATE.	TOTAL.		ESTABLISHMENTS EMPLOYING—																			
	Estab-	Wage earners (average number).	No wage earners.	1 to 5 wage earners, inclusive.			6 to 20 wage earners, inclusive.			21 to 50 wage earners, inclusive.			51 to 100 wage earners, inclusive.			101 to 250 wage earners, inclusive.			251 to 500 wage earners, inclusive.		Over 500 wage earners.	
			Establishments.	Establishments.	Wage earners.	Establishments.	Establishments.	Wage earners.	Establishments.	Establishments.	Wage earners.	Establishments.	Establishments.	Wage earners.	Establishments.	Establishments.	Wage earners.	Establishments.	Wage earners.	Establishments.	Wage earners.	
United States.....	1919.....	24	3,122	1	5	13	2	21	1	44	4	306	8	1,621	3	1,117	.....	.....	.....	1	519	
	1914.....	31	5,238	(2)	(2)	2,190	3	23	1	45	6	490	14	2,301	6	1,860	1	.....	.....	.....	.....	
Ohio.....		3	263	.....	2	4	1	13	.....	.....	1	64	1	186	3	1,117	.....	.....	.....	.....	.....	
Pennsylvania.....		11	2,005	.....	.....	.....	1	8	.....	.....	1	86	4	790	3	.....	.....	.....	.....	.....	.....	

TABLE 74.—NUMBER AND HORSEPOWER OF TYPES OF PRIME MOVERS: 1919, 1914, AND 1909.

POWER.	NUMBER OF ENGINES OR MOTORS.			HORSEPOWER.			Per cent distribution.				
	1919	1914	1909	Amount.			1919				
				1919	1914	1909	1919	1914	1909		
Primary power, total.....	176	163	32	18,697	9,355	8,154	100.0	100.0	100.0		
Owned.....	31	30	29	17,437	7,599	8,137	93.3	81.2	99.8		
Steam.....	30	27	27	17,420	7,116	7,087	93.3	76.1	97.3		
Engines.....	25	.....	.....	5,213	.....	.....	27.9	.....	.....		
Turbines.....	5	.....	2	5,213	.....	.....	27.9	.....	.....		
Internal-combustion engines.....	1	3	2	8	483	200	(*)	5.2	2.5		
Rented, electric.....	145	133	3	1,260	1,756	17	6.7	18.8	0.2		
Electric.....	581	292	102	8,943	3,948	1,147	100.0	100.0	100.0		
Rented.....	145	133	3	1,260	1,756	17	14.1	44.5	1.5		
Generated by establishments reporting.....	430	159	99	7,683	2,192	1,130	85.9	55.5	98.5		

<sup>1</sup> Figures for horsepower include for 1909 the amount reported under the head of "Other" owned power.<sup>2</sup> Less than one-tenth of 1 per cent.

# TIN PLATE AND TERNEPLATE.

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TABLE 75.—FUEL CONSUMED: 1919.

STATE.	COAL.			Coke (ton, 2,000 pounds).	Fuel oils (barrels).	Gaso- line and other vol- atile oils (bar- rels).	Gas (1,000 cubic feet).	STATE.	COAL.			Coke (ton, 2,000 pounds).	Fuel oils (barrels).	Gaso- line and other vol- atile oils (bar- rels).	Gas (1,000 cubic feet).
	Anthra- cite (ton; 2,240 pounds).	Bitumi- nous (ton, 2,000 pounds).													
United States, 1919	68,728	7	3,558	20	114,063			Pennsylvania	22	42,167		3,558	20	101,209	
1914	125,742	214	25,000	(1)	1,017,336			West Virginia		9,465				11,173	
Ohio	100	5,340				1,800		All other states		11,750		7		721	

<sup>1</sup> Included in figures for fuel oils.

## SPECIAL STATISTICS.

**Materials and products.**—The detailed statistics for materials and products include the dipping departments of black-plate mills, as well as the independent establishments that constitute the classified industry, and the material and product figures are comparable with those for prior censuses. Table 76 gives these statistics for 1919, 1914, and 1909. The cost of black plate constituted about 75 per cent, and the cost of coating metals about 20 per cent of the cost of materials in 1919. The corresponding percentages in 1919 were 69 and 23, respectively. The output of all tin and terne plate shows an average unit value of 6.92 cents per pound in 1919 as compared with 3.23 cents in 1914, and 3.48 cents in 1909. The increase in unit value, 1914 to 1919, is in keeping with the increase in material costs, black plates averaging 3.71 cents per pound in 1919, as compared with 1.89 cents in 1914; pig tin, 58 cents in 1919 and 39 cents in 1914; and pig lead, 5.12 cents in 1919 and 4.14 cents in 1914.

The 8 establishments included in the industry for 1919 engaged in redipping or recoating reported consumption of 29,376 pounds of pig tin, costing \$7,660, and products to the value of \$57,536, this amount being included under the item "All other products, including plates redipped, tin dross, scruff, scrap, etc."

TABLE 76.—MATERIALS AND PRODUCTS: 1919, 1914, AND 1909.

	1919	1914	1909
<b>MATERIALS.</b>			
Total cost.....	\$130,273,606	\$57,906,561	\$41,880,434
Tin and terne plate industry, cost. Tin and terne dipping departments of black-plate mills: Black plates and coating materials, cost.	\$73,422,649	\$57,906,561	\$41,880,434
Black plates, steel: Pounds.....	2,030,708,873	2,107,787,589	1,321,071,601
Cost.....	\$90,730,107	\$30,803,655	\$28,981,151
Produced by the establishment reporting— Pounds.....	2,503,351,524	2,084,530,680	1,291,048,100
Cost.....	\$98,433,207	\$30,335,112	\$28,245,234
Purchased— Pounds.....	37,447,340	23,250,920	30,023,582
Cost.....	\$1,206,090	\$408,543	\$735,917

<sup>1</sup> In 1919, all steel; 1914 includes 6,028,000 pounds of iron plates, valued at \$206,533; and 1909, 8,726,538 pounds, \$96,014.

TABLE 76.—MATERIALS AND PRODUCTS: 1919, 1914, AND 1909—Continued.

	1919	1914	1909
<b>MATERIALS—continued.</b>			
Coating metals:			
Pig tin— Pounds.....	43,628,872	36,542,881	28,586,267
Cost.....	\$25,350,062	\$14,167,237	\$8,400,794
Pig lead— Pounds.....	1,074,225	2,269,160	2,708,496
Cost.....	\$55,054	\$94,024	\$117,656
Terne mixture (purchased)— Pounds.....	7,288,245	6,618,211	9,632,996
Cost.....	\$1,439,588	\$783,546	\$1,001,587
Total tin and lead, including contents of terne mixture purchased, pounds:			
Tin.....	51,991,342	45,430,252	40,927,750
Lead.....	45,271,034	38,049,636	31,077,651
Plates for redipping:			
Pounds.....	348,565	(2)	(2)
Cost.....	\$24,040	(2)	(2)
Fuel and rent of power, cost.....	\$364,180	\$309,924	\$289,675
All other materials, cost.....	\$3,310,559	\$2,748,175	\$2,948,571
<b>PRODUCTS.</b>			
Total value.....	\$180,325,368	\$68,342,962	\$47,060,645
Tin and terneplate industry: Dipping departments of black plate mills.....	197,404,720	\$68,342,962	\$47,060,645
182,920,648			
Tin plate and terneplate: <sup>3</sup> Pounds.....	2,539,224,604	1,2,053,966,144	1,315,313,132
Value.....	\$175,776,283	\$86,270,345	\$45,815,146
Tin plate, steel— Pounds.....	2,373,253,628	1,901,331,895	1,123,068,875
Value.....	\$104,958,677	\$60,258,024	\$38,259,885
Coke plate— Pounds.....	2,336,703,947	1,855,892,526	(2)
Value.....	\$161,874,098	\$58,450,853	(2)
Charcoal plate— Pounds.....	36,549,681	45,430,360	(2)
Value.....	\$3,083,970	\$1,807,171	(2)
Terneplate, including long terne, steel— Pounds.....	165,971,036	152,634,249	101,344,257
Value.....	\$10,817,606	\$6,012,321	\$7,555,261
All other products, including plates redipped, tin dross, scruff, scrap, etc., value.....	\$4,540,085	\$2,072,617	\$2,154,490

<sup>3</sup> Figures not available.

<sup>4</sup> In addition, 2 establishments in 1919, 1 in 1914, and 3 in 1909, engaged primarily in other lines of manufacture, made some tin plate and terneplate.

<sup>4</sup> Includes 6,144,890 pounds of iron plate, valued at \$353,828; balance, steel.

**Production, exports, imports, and consumption.**—Table 77 gives comparative statistics of the production, exports, and imports of tin and terne plate for each census year since 1899, together with the figures for quantity retained for consumption. During the period covered by the table imports have fallen from 131,600,000 pounds to almost a vanishing point.

## MANUFACTURES.

TABLE 77.—PRODUCTION, EXPORTS, IMPORTS, AND CONSUMPTION: 1919, 1914, 1909, 1904, AND 1899.

	1919	1914	1909	1904	1899	PER CENT OF INCREASE, <sup>1</sup>			
						1914-1919	1909-1914	1904-1909	1899-1904
Retained for consumption, pounds.....	2,106,977,600	1,954,948,295	1,402,387,570	1,173,329,667	981,297,455	7.8	33.7	24.6	19.6
Of domestic origin, pounds.....	2,106,520,213	1,920,576,896	1,322,209,898	1,015,249,355	849,705,880	9.7	45.3	30.2	19.5
Of foreign origin, pounds.....	457,387	34,371,399	140,177,081	158,080,312	131,591,575	-98.7	-75.5	-11.3	20.1
Per cent of total—									
Domestic.....	99.98	98.2	90.4	86.5	86.6				
Foreign.....	0.02	1.8	9.6	13.5	13.4				
Domestic production, pounds.....	2,564,647,807	2,053,966,144	1,343,103,266	1,032,940,706	850,004,495	24.9	52.9	30.0	21.5
Exports of domestic, pounds.....	458,127,594	133,389,248	20,863,368	17,691,351	298,615	243.5	538.0	18.1	5,824.5
Retained for consumption, pounds.....	2,106,520,213	1,920,576,896	1,322,209,898	1,015,249,355	849,705,880	7.8	45.3	30.2	19.5
Imports, pounds.....	541,912	34,521,171	140,208,441	158,260,762	131,970,441	-98.4	-75.4	-11.4	19.9
Reexports, pounds.....	84,525	149,772	30,760	180,450	378,866	-43.6	387.0	-83.0	-52.4
Retained for consumption, pounds.....	457,387	34,371,399	140,177,081	158,080,312	131,591,575	-98.7	-75.5	-11.3	21.1

<sup>1</sup> A minus sign (−) denotes decrease.

**Equipment and capacity.**—Table 78 shows the dipping equipment as reported for the census years 1919, 1914, 1909, and 1904. On the basis of 300 working

days, the production of plate was approximately equal to two-thirds of full capacity in 1919, compared with 88 per cent in 1914 and 77 per cent in 1909.

TABLE 78.—EQUIPMENT AND CAPACITY: 1919, 1914, 1909, AND 1904.

	1919	1914	1909	1904			1919	1914	1909	1904	
							UNITED STATES—Continued.				
Number of dipping sets at end of year <sup>1</sup> .....	916	693	573	619			Number of establishments operating on: <sup>2</sup>				
Usually employed on tin plate.....	868	615	455	499			Single turn.....	2	6	5	(2)
Usually employed on terne plate.....	48	78	118	120			Double turn.....	3	5	10	.....
Number of building tin or terne sets at end of year.....	60	(2)	(2)	(2)			Triple turn.....	30	21	16	.....
Daily capacity, single turn, pounds <sup>1</sup> .....	6,332,288	3,868,000	2,840,000	3,451,000	Daily capacity as operated whether on single, double, or triple turn, pounds.....	18,658,000	10,720,000	7,016,000	(2)		
Tin plate.....	5,820,948	3,434,000	2,076,000	2,887,000							
Terneplate.....	511,340	414,000	764,000	567,000							

<sup>1</sup> Includes that of subsidiary establishments.<sup>2</sup> Figures not available.<sup>3</sup> Does not include 8 establishments engaged in retinning only.

## GENERAL TABLES.

**Comparative summary, by states.**—Table 79 gives the comparative statistics for the principal items, number of establishments, average number of wage earners, primary horsepower, wages, cost of materials,

and value of products for the census years 1919, 1914, and 1909.

**Detailed statement, by states.**—Table 80 is a detailed statement, by states, for the census of 1919.

TABLE 79.—COMPARATIVE SUMMARY, BY STATES: 1919, 1914, AND 1909.

STATE.	Cen-sus-year.	Num-ber of estab-lishments.	Wage earners (average num-ber).	Pri-mary horse-power.	Wages.	Cost of materials.	Value of products.	Expressed in thousands.				
								STATE.	Cen-sus-year.	Num-ber of estab-lishments.	Wage earners (average num-ber).	
United States.....	1919	24	3,122	18,697	\$5,756	\$73,423	\$07,405	Pennsylvania.....	1919	11	2,005	16,450
	1914	31	5,238	9,355	3,024	57,007	68,343		1914	13	2,368	1,785
	1909	31	5,352	8,154	3,315	41,889	47,970		1900	17	2,346	1,565
Ohio.....	1919	3	263	232	518	6,678	9,197	All other states.....	1919	10	854	2,006
	1914	7	953	1,330	659	9,443	10,826		1914	11	1,917	3,766
	1909	4	676	1,349	449	7,165	7,889		1909	10	2,330	4,740

TABLE 80.—DETAILED STATEMENT, BY STATES: 1919.

STATE.	Number of establish- ments.	PERSONS ENGAGED IN THE INDUSTRY.						WAGE EARNERS, DEC. 15, OR NEAREST REPRESENTATIVE DAY.						EXPENSES.		
		Total.	Propri- tors and firm mem- bers.	Sal- ried offi- cers, super- in- tend- ents and man- agers.	Clerks, etc.		Wage earners.		Total.	16 and over.		Under 16.				
					Male.	Female.	Aver- age num- ber.	Number, 15th day of—		Male.	Female.	Male.	Female.			
United States..	24	3,636	9	347	173	35	3,122	Fe. 3,880 Je. 2,367	3,507	3,077	485	5	.....	\$34,315,066	\$613,072	\$558,914
Ohio.....	3	315	1	19	24	8	203	Au. 440 Oc. 25	416	354	62	.....	.....	2,620,016	60,482	46,911
Pennsylvania.....	11	2,342	4	209	64	.....	2,005	Fe. 2,454 My. 1,492	2,259	1,057	207	5	.....	20,418,077	357,184	348,068
All other states <sup>1</sup> .....	10	1,029	4	59	85	27	834	.....	892	706	126	.....	.....	11,276,073	195,408	163,935

## EXPENSES—continued.

STATE.	EXPENSES—continued.			POWER.										Electric horse- power gen- erated in es- tab- lish- ments report- ing.
	Salaries and wages— Con.	For con- tract work.	Rent of factory.	Taxes; Federal, state, county, and local.	Principal materials.	Fuel and rent of power.	Value of products.	Value added by manufac- ture.	Total.	Steam engines.	Internal- combust- ion en- gines.	Water wheels and motors.	Ellec- tric (rent- ed). <sup>2</sup>	
Wage earners.														
United States..	\$5,750,417	\$207	\$5,425	\$1,857,027	\$73,058,460	\$304,189	\$97,404,720	\$23,982,071	18,097	17,429	8	.....	1,260	7,683
Ohio.....	518,321	.....	3,600	228,707	6,057,974	15,145	9,106,593	2,523,474	232	230	.....	.....	2	153
Pennsylvania.....	3,651,074	430	1,030,074	44,488,214	206,221	58,815,616	14,061,181	16,459	16,448	8	.....	1,255	3	6,586
All other states <sup>1</sup> .....	1,586,122	207	1,395	598,150	21,912,272	82,823	29,392,511	7,397,410	2,006	751	.....	.....	1,255	944

<sup>1</sup>All other states embrace: California, 1 establishment; Indiana, 2; Minnesota, 1; New York, 1; West Virginia, 4; and Wisconsin, 1.<sup>2</sup>Chiefly electric motors operated by rented (or purchased) current; other power included (chiefly shaft-belt or transmitted power from neighboring power plants).

# WIRE.

## GENERAL STATISTICS.

**General character of the industry.**—The statistics for the wire industry as here presented comprise: (1) Independent wire-drawing mills, the same constituting the classified industry; (2) the wire-drawing departments of steel works and rolling mills, the general statistics for which are included in the report for the rolling mills; and (3) wire-drawing departments of establishments engaged primarily in other lines of manufacture, especially brass and copper rolling mills, which are included in the industry to which their chief products relate.

Statistics relating to capital, labor, and other general items can not be segregated for the wire departments of rolling mills, that is for establishments of the second and third classes, and hence are not included in the general statistics for the industry; but the special statistics for materials and products are comprehensive for the industry, and cover same, irrespective of whether the establishment is a department of a rolling mill or an independent wire-drawing mill. The unit of quantity used is the short ton of 2,000 pounds.

**The industry as a whole.**—Table 81 is a summary of the three classes of wire-drawing mills for 1919, 1914, and 1909, showing the number of establishments and value of products, with per cent of increase for the intervening census periods. There were 108 wire-drawing establishments in 1919 compared with 99 in 1914 and 93 in 1909. Classified according to metals there were in 1919, 74 establishments that drew iron and steel wire; 30, copper wire; 22, brass; 7, nickel silver; 5, bronze; 2 each, aluminum, copper clad, nickel or nickel alloy, and phosphor bronze; and 1 each, German silver, monel metal, resistance compound, and zinc-copper.

**Comparative summary.**—Table 82 is a summary of the general statistics for the classified industry for the censuses of 1919, 1914, and 1909. Figures for previous census years do not give a correct view of the growth of the industry, and are therefore omitted.

**Principal states, ranked by value of products.**—Table 83 gives the general statistics, by states, ranked according to value of products.

**Persons engaged in the industry.**—Table 84 presents the comparative statistics for 1919, 1914, and 1909, classified by occupational status, sex, and age. The age classification of the average number of wage earners is an estimate obtained by the method described in the "Explanation of terms."

**Wage earners, by months.**—In Table 85 are shown the wage earners in the industry in 1919, 1914, and 1909; and for 1919, by states, and by months. In certain states, notably Ohio, Illinois, and New York, there were marked variations in number of wage earners as between the minimum and maximum months.

**Prevailing hours of labor.**—Comparative statistics of wage earners, classified according to prevailing hours of labor per week, are given in Table 86. In 1909, 57.4 per cent of the wage earners were employed in establishments where the prevailing hours of labor per week were 60 or more, but with the movement towards shortening the hours of labor, this proportion in 1914 dropped to 43.4 per cent and in 1919 to 29.4 per cent. On the other hand, in 1909 no wage earners were reported for establishments where the prevailing hours of labor per week were 48 or less, but in 1914, 3.8 per cent were so reported, and in 1919, 4.7 per cent.

**Size of establishments, by average number of wage earners.**—In 1919 the average number of wage earners per establishment was 299 and in 1914, 326. The industry, as shown in Table 87, is of relatively large units, and in 1919 there were 28 establishments that employed over 250 wage earners per establishment, the wage earners representing 88 per cent of all for the industry; in 1914, 22 establishments, with 84.5 per cent of all wage earners, were of this character.

**Size of establishments, by value of products.**—Statistics for establishments, ranked by value of products, are given in Table 88. The average value of products per establishment in 1909 was approximately \$1,509,000 and in 1914 \$1,516,000, with an increase to \$2,457,000 in 1919, largely due to advance in values. One-half of the establishments in 1919 reported products in excess of \$1,000,000, the aggregate value for these establishments constituting 93.7 per cent of the total value of products for the industry.

**Character of ownership.**—Of the 66 establishments engaged in the wire-drawing industry in 1919, 58 were owned by corporations, 4 by individuals, and 4 were of the "All other" class, chiefly firms. The corporation group reported 98.7 per cent of the wage earners and 99.2 per cent of the value of products.

**Number and horsepower of types of prime movers.**—Table 89 gives the statistics for power used in the industry in 1919, 1914, and 1909. Rented or purchased electric power is an important factor, and forms nearly one-half of the primary power reported for the industry. In addition, the establishments generate electric power to a very considerable extent, and of the total power, 72.5 per cent was utilized in the form of electric power in 1919, this including purchased electric power and that generated by the establishment. In 1914 the proportion of primary power utilized in the form of electric energy was 47 per cent, and in 1909, 26 per cent.

**Fuel consumed.**—Fuel statistics are presented in Table 90. Gas includes both natural and manufactured gas.

TABLE 81.—THE INDUSTRY AS A WHOLE: 1919, 1914, AND 1909.

		NUMBER OF ESTABLISHMENTS.			VALUE OF PRODUCTS.			PER CENT OF INCREASE. <sup>1</sup>	
		1919	1914	1909	1919	1914	1909	1914-1919	1909-1914
		108	99	93	\$392,601,073	\$172,600,546	\$180,083,522	127.5	-4.2
Total.					384,919,118	166,999,888	173,349,614	130.5	-3.7
Wire and manufactures of wire.		66	54	56	157,513,598	78,150,487	79,249,869	101.6	-1.4
(1) Wire mills.		27	24	23	204,184,076	73,062,790	77,470,814	179.5	-5.7
(2) Wire departments of iron and steel rolling mills.		15	21	14	23,221,444	15,786,611	16,628,931	47.1	-5.1
(3) Brass and copper rolling mills and other concerns.					7,681,955	5,600,658	6,733,908	37.2	-16.8
All other products.									

<sup>1</sup>A minus sign (—) denotes decrease.

TABLE 82.—COMPARATIVE SUMMARY: 1919, 1914, AND 1909.

	WIRE MILLS USING PURCHASED RODS.			PER CENT OF INCREASE. <sup>1</sup>			WIRE MILLS USING PURCHASED RODS.			PER CENT OF INCREASE. <sup>1</sup>	
	1919	1914	1909	1914-1919	1909-1914		1919	1914	1909	1914-1919	1909-1914
	Number of establishments.	Person engaged.	Proprietors and firm members.	Salaried employees.	Wage earners (average number).	Primary horsepower.	Capital.				
Number of establishments.	66	54	50	12.0	-1.0						
Person engaged.	22,236	19,740	19,045	12.0	-1.0						
Proprietors and firm members.	13	18	15								
Salaried employees.	2,482	2,122	1,840	17.0	15.0						
Wage earners (average number).	19,741	17,600	18,084	12.2	-2.7						
Primary horsepower.	119,451	83,940	71,959	42.3	16.0						
Capital.	\$102,010,777	\$64,013,668	\$60,157,073	59.4	6.4						

<sup>1</sup>A minus sign (—) denotes decrease.<sup>2</sup>Value of products less cost of materials.

TABLE 83.—PRINCIPAL STATES, RANKED BY VALUE OF PRODUCTS: 1919.

STATE,	Number of establishments.	WAGE EARNERS.			VALUE OF PRODUCTS.			VALUE ADDED BY MANUFACTURE.		
		Average number.	Percent distribution.	Rank.	Amount (expressed in thousands).	Percent distribution.	Rank.	Amount (expressed in thousands).	Percent distribution.	Rank.
United States.	66	19,741	100.0	...	\$102,151	100.0	...	\$59,338	100.0	...
Illinois.	10	2,775	14.1	2	20,855	18.4	1	11,408	19.2	2
Massachusetts.	9	5,203	22.4	1	24,652	15.1	2	12,679	21.4	1

TABLE 84.—PERSONS ENGAGED IN WIRE MILLS USING PURCHASED RODS: 1919, 1914, AND 1909.

CLASS.	Cen-sus-year.	PER CENT OF TOTAL.				CLASS.	Cen-sus-year.	PER CENT OF TOTAL.				
		Male.	Female.	Male.				Male.	Female.			
		Male.	Female.	Male.				Male.	Female.			
All classes.	1919	22,236	20,081	1,105	92.8	7.2	1919	1,883	1,295	598	68.2	31.2
	1914	10,740	18,982	1,058	94.6	5.4	1914	1,095	1,252	343	79.8	20.2
	1909	10,945	18,904	1,041	94.8	6.2	1909	1,462	1,240	222	84.8	15.2
Proprietors and officials.	1919	612	605	7	98.0	1.1	Clerks and other subordinate salaried employees.					
	1914	445	438	7	98.4	1.6	1914	10,741	18,731	1,010	94.8	5.2
	1909	309	395	4	99.0	1.0	1914	17,600	16,892	708	96.0	4.0
Proprietors and firm members.	1919	13	12	1	92.3	7.7	1909	18,084	17,269	815	95.5	4.5
	1914	18	14	4	77.8	22.2	10 years and over.					
	1909	15	13	2	86.7	13.3	1919	19,670	18,682	988	95.0	5.0
Salaried officers of corporations...	1919	122	119	3	97.5	2.5	1914	17,590	16,884	708	96.0	4.0
	1914	76	74	2	97.4	2.6	1909	17,992	17,190	802	95.5	4.5
	1909	78	77	1	98.7	1.3	Under 16 years of age.					
Superintendents and managers...	1919	477	474	3	99.4	0.6	1919	71	49	22	69.0	31.0
	1914	351	350	1	99.7	0.3	1914	10	8	2	80.0	20.0
	1909	306	305	1	99.7	0.3	1909	92	79	13	85.9	14.1

## MANUFACTURES.

TABLE 85.—WAGE EARNERS, BY MONTHS, FOR WIRE MILLS USING PURCHASED RODS, FOR SELECTED STATES: 1919

[The month of maximum employment is indicated by bold-faced figures and that of minimum employment by *italic* figures.]

STATE.	Average number employed during year.	NUMBER EMPLOYED ON 15TH DAY OF THE MONTH OR NEAREST REPRESENTATIVE DAY.												Per cent minimum is of maximum.	
		January.	Februa-	March.	April.	May.	June.	July.	Septem-	ber.	Octo-	ber.	Novem-	ber.	
		ry.	ry.						ber.	ber.	ber.	ber.	ber.	ber.	
United States:															
1919.....	19,741	21,043	20,868	19,903	19,038	18,988	18,656	19,838	21,016	21,282	17,335	18,796	20,039	81.5	
Males.....	18,731	19,864	19,592	18,905	18,152	18,135	17,845	18,935	19,997	20,281	16,956	17,759	18,951	80.6	
Females.....	1,010	1,179	1,276	1,088	886	853	811	903	1,019	1,001	979	1,037	1,088	83.5	
1914.....	17,600	18,483	18,733	18,816	18,363	17,864	17,575	17,200	17,000	17,329	17,207	16,369	16,255	86.4	
1909.....	18,084	17,763	18,147	17,604	17,131	17,432	17,862	17,864	17,673	18,206	18,530	19,091	19,341	87.2	
Connecticut.....	1,378	1,531	1,593	1,244	1,056	1,095	1,130	1,454	1,492	1,513	1,468	1,558	1,393	66.1	
Illinois.....	2,775	3,198	3,129	3,072	2,947	2,883	2,960	3,102	3,308	3,129	1,488	1,887	2,216	44.4	
Massachusetts.....	5,203	5,201	5,105	5,089	4,970	4,935	4,910	4,900	5,050	5,238	5,372	5,701	5,905	52.1	
New Jersey.....	1,923	2,024	1,902	1,846	1,773	1,717	1,776	1,891	1,934	2,033	2,068	2,007	2,057	83.1	
Pennsylvania.....	2,203	2,208	2,105	2,109	2,011	2,041	2,194	2,372	2,469	2,404	2,005	2,179	2,299	81.1	

TABLE 86.—AVERAGE NUMBER OF WAGE EARNERS, BY PREVAILING HOURS OF LABOR PER WEEK, FOR SELECTED STATES: 1919 AND 1914.

STATE.	Cen-sus year.	Total.	IN ESTABLISHMENTS WHERE THE PREVAILING HOURS OF LABOR PER WEEK WERE—							STATE.	Cen-sus year.	Total.	IN ESTABLISHMENTS WHERE THE PREVAILING HOURS OF LABOR PER WEEK WERE—							
			44 and under.	Be-tween 44 and 48.	Be-tween 48 and 54.	54.	Be-tween 54 and 60.	60.	Over 60.				44 and under.	Be-tween 44 and 48.	Be-tween 48 and 54.	54.	Be-tween 54 and 60.	60.	Over 60.	
United States.	1910	19,741	98	53	768	1,725	2,318	8,978	3,447	2,354	Massachusetts	1910	5,203	.....	.....	.....	493	4,710	.....	
	1914	17,600	(2)	(2)	669	4,396	333	4,561	6,824	517		1914	2,899	.....	.....	.....	870	2,029	.....	
	1909	18,084	(2)	(2)	.....	76	1	7,626	10,232	149		.....	.....	.....	.....	.....	.....	.....	.....	
Connecticut.....	1910	1,378	.....	.....	435	5	.....	938	.....	.....	New Jersey.....	1919	1,923	.....	.....	66	784	1,020	.....	
	1914	786	.....	.....	.....	.....	.....	382	404	.....		1914	5,821	.....	53	4,396	1,299	126	.....	
Illinois.....	1910	2,775	.....	(2)	296	.....	15	216	1,388	880	Pennsylvania.....	1919	2,203	90	.....	14	52	316	960	77
	1914	2,763	(2)	(2)	655	.....	.....	1,038	816	254		1914	1,248	(2)	(2)	14	35	622	14	56

<sup>1</sup> Includes 48 aid under for 1914 and 1900.

<sup>2</sup> Figures not available.

TABLE 87.—SIZE OF ESTABLISHMENTS, BY AVERAGE NUMBER OF WAGE EARNERS, FOR SELECTED STATES: 1919

STATE.	TOTAL.		ESTABLISHMENTS EMPLOYING—									
	Establishments.	Wage earners (average) number.	No wage earners.	1 to 5 wage earners, inclusive.	6 to 20 wage earners, inclusive.	21 to 50 wage earners, inclusive.	51 to 100 wage earners, inclusive.	101 to 250 wage earners, inclusive.	251 to 500 wage earners, inclusive.	501 to 1,000 wage earners, inclusive.	Over 1,000 wage earners.	
United States...1910..	66	19,741	1	5	14	109	3	102	825	1,355	5,301	10
1914..	54	17,800	4	8	5	71	7	274	249	2,124	5,094	5
Connecticut.....	7	1,378	1	1	5	1	21	1	73	2	733	1
Illinois.....	10	2,775	1	1	15	1	21	2	160	2	1,537	1
Massachusetts.....	9	5,203	2	26	1	45	1	117	1	376	1	274
New Jersey.....	7	1,923	1	1	3	42	3	191	1	114	1	298
Pennsylvania.....	11	2,203	1	1	3	42	1	2	2	333	2	627

TABLE 88.—SIZE OF ESTABLISHMENTS, BY VALUE OF PRODUCTS: 1919, 1914, AND 1909.

VALUE OF PRODUCT.	NUMBER OF ESTABLISHMENTS.			AVERAGE NUMBER OF WAGE EARNERS.			VALUE OF PRODUCTS.			VALUE ADDED BY MANUFACTURE.		
	1919	1914	1909	1919	1914	1909	1919	1914	1909	1919	1914	1909
	66	54	56	19,741	17,600	18,084	\$162,151,236	\$81,841,012	\$84,486,518	\$59,337,645	\$25,416,518	\$23,943,587
All classes.....	66	54	56	19,741	17,600	18,084	\$162,151,236	\$81,841,012	\$84,486,518	\$59,337,645	\$25,416,518	\$23,943,587
Less than \$5,000.....	5	3	4	12	17	12	60,528	29,983	36,337	22,935	10,760	15,750
\$5,000 to \$20,000.....	7	9	5	68	161	108	424,879	477,697	250,017	188,221	213,741	91,282
\$20,000 to \$100,000.....	12	12	30	616	3,223	4,659	3,060,822	4,367,664	6,502,043	1,357,224	3,957,119	5,102,294
\$100,000 to \$500,000.....	9	9	30	947	18,098	14,199	6,666,632	151,038,375	70,463,825	69,415,619	2,838,139	21,234,898
\$500,000 to \$1,000,000.....	33	21	17	18,098	14,199	13,305	151,038,375	70,463,825	69,415,619	54,031,126	21,234,898	18,734,252
\$1,000,000 and over.....												

  

PER CENT DISTRIBUTION.												
All classes.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Less than \$5,000.....	7.6	5.5	7.1	0.1	0.1	0.1	(1)	(1)	(1)	(1)	(1)	0.1
\$5,000 to \$20,000.....	10.6	16.7	8.9	0.3	0.9	0.6	0.3	0.6	0.3	0.3	0.8	0.4
\$20,000 to \$100,000.....	18.2	22.2	53.6	3.1	18.3	25.8	1.9	5.3	17.5	2.3	15.6	21.3
\$100,000 to \$500,000.....	13.6	16.7	4.8	4.8	4.1	8.0	4.1	8.0	4.8	4.8	83.6	78.2
\$500,000 to \$1,000,000.....	50.0	38.9	30.4	91.7	80.7	73.6	93.7	86.1	82.2	92.6		
\$1,000,000 and over.....												

<sup>1</sup> Less than one-tenth of 1 per cent.

TABLE 89.—NUMBER AND HORSEPOWER OF TYPES OF PRIME MOVERS USED IN WIRE MILLS USING PURCHASED RODS: 1919, 1914, AND 1909.

POWER.	NUMBER OF ENGINES OR MOTORS.			HORSEPOWER.					
	1919	1914	1909	Amount.			Per cent distribution.		
				1919	1914	1909	1919	1914	1909
Primary power, total.....	2,445	919	443	110,451	83,940	71,950	100.0	100.0	100.0
Owned.....	147	255	315	64,271	67,437	68,923	53.8	80.3	95.7
Steam <sup>1</sup> .....	129	218	203	61,666	63,015	63,516	51.6	75.1	88.1
Engines.....	101	(2)	(2)	36,021	(2)	(2)	30.1		
Turbines.....	28			25,645			21.5		
Internal-combustion engines.....	8	22	28	1,906	3,420	3,256	1.7	4.1	4.5
Water wheels, turbines, and motors.....	10	15	19	630	993	2,151	0.5	1.2	3.0
Rented.....	2,298	664	128	55,180	16,503	3,036	46.2	19.7	4.2
Electric.....	2,148	664	128	55,030	16,463	3,031	46.1	19.6	4.2
Other.....	150			150	40	5	0.1	(3)	(3)
Electric.....	3,320	1,038	1,019	80,646	39,458	18,824	100.0	100.0	100.0
Rented.....	2,148	664	128	55,030	16,463	3,031	63.5	41.7	16.1
Generated by establishments reporting.....	1,181	972	891	31,616	22,905	15,793	36.5	58.3	83.9

<sup>1</sup> Figures for horsepower include for 1909 the amount reported under the head of "Other" owned power.<sup>2</sup> Not reported separately in 1914 and 1909.<sup>3</sup> Less than one-tenth of 1 per cent.

TABLE 90.—FUEL CONSUMED, FOR WIRE MILLS USING PURCHASED RODS: 1919.

STATE.	COAL.			STATE.....	COAL.			Coke (ton, 2,000 pounds).	Fuel oils (barrels).	Gasoline and other volatile oils (barrels).	Gas (1,000 cubic feet).					
	Anthracite <sup>1</sup> (ton, 2,240 pounds).	Bitumi- nous (ton, 2,000 pounds).	Coke (ton, 2,000 pounds).		Anthra- cite <sup>1</sup> (ton, 2,240 pounds).	Bitumi- nous (ton, 2,000 pounds).	Gas (1,000 cubic feet).									
United States...1919..	12,573	726,040	18,547	172,693	3,589	410,310	2,034	2,350	193,189	2,005	33,950	262				
1914..	30,067	523,603	14,329	88,979	(2)	415,873		220	17,000	270		389				
Connecticut.....	528	20,943	622	11,125	472	2,034		126,065	1,936	2,300		303,444				
Illinois.....	1,944	153,884	1,075	4,072	472	4,244		155	49,282	9,082	15,638	125				
Massachusetts.....	2,420	90,047	174	82,070	2,644	6,089		2,251	2,532	1,398		92,949				
								2,687	58,898	1,385	22,574	82				
All other states.....												1,627				

<sup>1</sup> Includes some semianthracite.<sup>2</sup> Included in figures for fuel oils.

## MANUFACTURES.

## SPECIAL STATISTICS.

**Materials.**—Table 91 gives statistics for 1919 and 1914 segregated as between the wire mills, so-called, which are the establishments constituting the classified industry, and the wire departments of rolling mills

and other concerns, including the wire-drawing establishments affiliated with wire-rod rolling mills, the general statistics for which are contained in the reports for the rolling-mill establishments.

TABLE 91.—MATERIALS: 1919 AND 1914.

[Ton, 2,000 pounds.]

KIND.	TOTAL.		WIRE MILLS (WIRE RODS PURCHASED).		WIRE DEPARTMENTS OF ROLLING MILLS AND OTHER CONCERNS.		PER CENT OF INCREASE, 1914-1910.		
	1919	1914	1919	1914	1919	1914	Total	Wire mills.	Wire departments.
Total cost.....			\$102,813,591	\$56,424,404				82.2	.....
Wire rods, cost.....	\$198,580,306	\$104,621,056	\$78,805,136	\$43,374,763	\$119,775,170	\$61,246,293	89.8	81.7	95.6
Steel—									
Tons.....	2,641,684	2,495,201	986,233	847,583	1,655,451	1,647,318	5.9	16.3	0.5
Cost.....	\$122,574,516	\$50,161,732	\$48,052,550	\$21,609,338	\$74,521,066	\$37,552,394	107.0	122.0	98.4
Produced by consumer—									
Tons.....	2,211,400	2,030,735	561,754	395,694	1,649,646	1,635,041	8.9	43.0	0.9
Assigned cost.....	\$90,829,357	\$46,356,401	\$25,678,407	\$9,691,973	\$74,150,950	\$37,264,428	115.0	182.0	99.0
Purchased—									
Tons.....	430,284	464,466	424,479	452,189	5,805	12,277	-7.4	-6.1	-52.7
Cost.....	\$22,745,159	\$12,805,331	\$12,374,143	\$12,517,365	\$371,016	\$287,966	77.6	78.7	28.8
By kinds of steel—									
Bessemer—									
Tons.....	1,142,820	948,552	613,995	539,879	528,834	409,173	20.5	13.8	29.2
Cost.....	\$49,452,733	\$21,046,599	\$27,990,081	\$12,081,408	\$21,462,052	\$8,965,191	135.0	132.0	139.0
Open-hearth—									
Basic—									
Tons.....	1,360,034	1,483,968	305,197	279,260	1,054,837	1,204,708	-8.3	9.8	-12.4
Cost.....	\$62,527,596	\$30,150,876	\$14,349,563	\$8,368,034	\$48,178,033	\$27,782,842	73.0	71.5	73.4
Acid—									
Tons.....	117,172	56,527	45,794	23,235	71,378	33,292	107.0	97.1	114.0
Cost.....	\$8,033,523	\$1,051,223	\$3,211,310	\$880,643	\$4,822,213	\$790,580	386.0	273.0	510.0
Crucible and other—									
Tons.....	21,049	6,154	21,247	6,009	402	145	252.0	254.0	177.0
Cost.....	\$2,560,664	\$313,034	\$2,500,996	\$299,253	\$59,668	\$13,751	718.0	738.0	333.0
Iron—									
Tons.....	1,767	2,579	101	2,579	1,666	.....	-31.5	-96.1	.....
Cost.....	\$174,983	\$121,651	\$18,042	\$121,651	\$150,041	.....	43.8	-85.2	.....
Copper—									
Tons.....	192,274	141,214	82,928	73,545	100,346	67,669	36.2	12.8	61.6
Cost.....	\$62,135,179	\$39,653,902	\$20,451,576	\$20,214,926	\$32,683,603	\$10,438,976	56.7	45.7	68.1
Brass—									
Tons.....	25,751	19,513	1,824	1,950	23,927	17,563	32.0	-6.5	36.2
Cost.....	\$9,200,433	\$4,758,408	\$674,612	\$696,107	\$8,525,821	\$4,063,209	93.4	-2.9	110.0
Zinc—									
Tons.....	1,326	(2)	(3)	(3)	1,326	(2)	.....	.....	.....
Cost.....	\$237,209	(2)	.....	.....	\$237,209	(2)	.....	.....	.....
Other metal, cost <sup>3</sup> .....	\$4,257,806	\$925,365	\$608,356	\$733,741	\$3,649,540	\$101,624	360.0	-17.1	804.0
Wire, plain or coated, not produced in mill reporting:									
Tons.....	76,377	36,880	29,966	9,474	46,411	27,415	107.1	216.3	69.3
Cost.....	\$10,665,029	\$1,994,839	\$3,021,469	\$537,750	\$7,643,560	\$1,497,080	435.0	462.0	425.0
Fuel and rent of power, cost.....			\$4,235,523	\$1,813,172	.....	.....	.....	134.0	.....
All other materials, cost.....			\$10,751,463	\$10,698,800	.....	.....	.....	56.6	.....

<sup>1</sup>A minus sign (—) denotes decrease.<sup>2</sup>Figures not available.<sup>3</sup>Includes bronze, phosphor bronze, monel metal, copper-clad steel, silver and nickel alloys.

**Products.**—The statistics pertaining to products for all classes of establishments are presented in Table 92, segregated as above described for materials. The table carries comparative figures for total wire production, classified as to metal and whether produced

for consumption or for sale. The table also carries percentages of increase for the census period 1914-1919 with respect to total production, and also for the two classes of establishments.

TABLE 92.—PRODUCTS: 1919 AND 1914.  
[Ton, 2,000 pounds.]

KIND.	TOTAL.		WIRE MILLS (WIRE RODS PURCHASED).		WIRE DEPARTMENT OF ROLLING MILLS AND OTHER CONCERNs.		PER CENT OF INCREASE, <sup>1</sup> 1914-1919.		
	1919	1914	1919	1914	1919	1914	Total	Wire mills.	Wire departments.
Wire drawn, total tons.....	2,724,442	2,597,407	1,001,879	\$98,523	1,722,563	1,608,884	4.9	11.5	1.4
Steel and iron wire:									
Total production.....	2,508,800	2,435,530	920,918	821,569	1,587,972	1,613,961	3.0	12.1	-1.6
For sale (plain or bare).....	502,434	459,999	242,059	206,575	347,475	253,334	28.8	18.6	37.2
For consumption.....	1,916,450	1,070,621	675,959	614,994	1,240,497	1,360,627	-3.0	9.9	-8.8
Copper wire:									
Total production.....	184,580	138,024	78,510	72,401	106,059	66,523	32.9	8.4	50.4
For sale (plain or bare).....	140,991	84,921	60,827	54,210	86,184	30,711	73.1	12.2	180.6
For consumption.....	37,578	54,003	17,683	18,191	19,895	35,812	-30.4	-2.8	-44.4
Brass wire: Total production.....	23,625	10,491	1,794	21,831	{ 6,701 }	18,400	{ 21.2 }	{ -46.2 }	{ 55.1 }
Other metal: Total production.....	7,358	3,462	657	4,553	{ 6,701 }	112.5	{ 127.4 }	{ 98.1 }	{ 153.9 }
PRODUCTS.									
Total value.....	\$302,001,073	\$172,670,546	\$162,151,236	\$81,841,012	\$230,449,837	\$90,750,534	127.4	98.1	153.9
Wire and manufactures of wire.....	\$384,010,118	\$160,000,888	\$157,513,598	\$78,150,487	\$227,405,520	\$88,349,401	130.5	101.6	156.3
Steel and iron—									
Tons.....	2,554,385	2,465,383	943,693	835,928	1,610,692	1,629,455	3.6	12.9	-1.2
Value.....	\$264,777,027	\$116,215,503	\$106,625,257	\$48,809,661	\$158,152,670	\$67,408,842	127.8	118.5	134.6
Plain wire—									
Tons.....	502,434	450,900	244,959	206,575	347,475	253,334	28.8	18.6	37.2
Value.....	\$58,750,450	\$22,310,778	\$28,494,089	\$12,021,557	\$30,282,361	\$9,395,221	163.3	120.5	222.1
Galvanized wire—									
Tons.....	343,005	172,958	158,018	170,047	218,462	4.9	24.1	-8.7	
Value.....	\$32,383,503	\$15,812,146	\$7,123,026	29,327	\$8,826,505	136.0	160.2	116.5	
Other coated wire:									
Tons.....	40,025	374,478	20,598	\$2,537,981					
Value.....	\$5,257,088	\$15,940,531	\$2,719,707						
Wire nails and spikes—									
Kegs (100 pounds).....	12,429,105	12,880,634	3,877,122	3,200,925	8,752,073	9,070,709	-3.5	14.6	-9.6
Value.....	\$40,291,086	\$23,368,633	\$15,062,373	\$6,048,598	\$34,229,313	\$17,320,035	110.9	149.0	97.6
Wire brads and tacks—									
Pounds.....	5,461,507	3,998,185	1,463,450	250,071	274,481	-0.7	18.5	-5.6	
Value.....	\$415,821	\$248,664	\$167,157						
Wire staples—									
Pounds.....	68,221,338	18,376,000	16,084,845	52,130,403	48,294,000	10.5	9.3	11.0	
Value.....	\$2,745,070	\$1,324,048	\$386,271	\$938,077	138.6	124.1	144.5		
Barbed wire—									
Tons.....	341,127	343,693	82,056	69,232	250,071	274,481	-0.7	18.5	-5.6
Value.....	\$30,895,610	\$13,764,367	\$7,305,381	\$2,822,668	\$23,500,238	\$10,940,690	124.5	158.7	115.6
Wire rope, cable, and strand—									
Tons.....	103,010	52,735	55,032	43,217	47,378	9,518	95.3	28.7	397.8
Value.....	\$20,826,513	\$7,973,537	\$12,187,216	\$6,881,138	\$17,638,297	\$1,002,399	274.1	77.1	1,514.6
Woven-wire fence and poultry netting—									
Tons.....	312,140	411,460	97,064	128,370	215,082	288,081	-24.1	-24.4	-24.0
Value.....	\$30,520,061	\$10,705,812	\$10,320,876	\$6,763,469	\$20,206,085	\$13,032,543	34.2	52.6	55.0
Other woven-wire products—									
Tons.....	20,614	22,721	13,417	9,614	13,197	14,107	17.1	55.8	-6.5
Value.....	\$4,274,177	\$2,822,680	\$2,184,987	\$915,490	\$2,086,190	\$1,007,199	51.4	138.9	9.5
Cold-rolled flat wire—									
Tons.....	45,908	30,208	30,208	15,700					
Value.....	\$9,751,009	\$6,401,009	•	\$3,350,000					
Washers—									
Tons.....	433	122,720	27	406	68,509	4.2	16.4	-5.5	
Value.....	\$40,152	\$8,800,208	\$7,056	\$4,940,444	\$38,497	\$3,052,704	120.3	136.0	120.9
Other fabricated iron and steel wire products—									
Tons.....	81,482	32,877	48,605	35,344,151					
Value.....	\$10,007,078	\$5,263,527							
Copper—									
Bare wire—									
Tons.....	140,001	84,021	60,827	54,210	86,164	30,711	73.1	12.2	180.6
Value.....	\$56,047,607	\$20,206,024	\$20,873,030	\$10,177,678	\$20,774,477	\$10,028,346	116.2	66.1	196.9
Insulated wire and cable <sup>2</sup> —									
Tons.....	72,007	48,386	32,687	32,410	33,920	15,976	50.1	0.0	149.0
Value.....	\$44,465,418	\$16,700,244	\$21,825,430	\$10,850,232	\$22,639,970	\$4,854,012	183.1	101.1	366.4
Woven-wire products—									
Tons.....	206	140	66						
Value.....	\$223,596	\$143,596	\$80,000						
Other fabricated copper-wire products—									
Tons.....	790	2,130	400	790	1,631	-53.2	-71.9	-47.5	-6.8
Value.....	\$503,077	\$1,013,282	\$201,380	\$503,077	\$721,902	-19.4	-50.7		
Brass wire—									
Pounds.....	47,240,835	30,614,500	3,588,721	4,361,148	43,661,114	35,253,352	19.3	-17.7	23.8
Value.....	\$11,542,020	\$6,360,342	\$1,040,427	\$850,017	\$10,501,593	\$5,516,325	81.3	22.4	90.4
Other metals—									
Bronze (including phosphor bronze and monel) wire—									
Pounds.....	1,342,706	163,242	1,179,464						
Value.....	\$624,620	\$68,820	\$580,700						
Nickel, nickel silver, etc., wire—									
Pounds.....	1,752,052	640,000	1,103,062						
Value.....	\$1,457,588	\$714,163	\$743,425						
Other (includes copper-clad steel) wire—									
Pounds.....	6,920,308	5,344,730	1,584,668						
Value.....	\$1,480,403	\$1,160,519	\$322,974						
Fabricated wire products—									
Pounds.....	10,871,138	501,938	10,169,200						
Value.....	\$8,876,000	\$1,07,806	\$5,678,194						
Value.....	948,858	948,858	948,858						
Value.....	\$711,405	\$711,405	\$711,405						
Value.....	\$3,058,042	\$2,581,000	\$886,324						
Finished products, other than wire...value.....	30,747	23,506	13,241						
Value.....	\$609,871	\$2,692,302	\$1,252,837						
All other products, value.....	\$3,717,944	\$1,813,480	\$1,904,404						
Amount received for custom work and repairing, value.....	\$236,098	\$327,356	\$164,880						
		\$236,098	\$164,880						

<sup>1</sup>A minus sign (-) denotes decrease.<sup>2</sup>Isolated wire and cable made by all establishments, including the electrical machinery, apparatus, and supplies industry in 1919, 224,000 net tons, value \$128,582,339; 1914, value \$89,505,513; 1909, \$61,624,737.

## MANUFACTURES.

**Number of establishments.**—Table 93 shows the number of establishments reporting the various specified products, distributed by states, for 1919 and 1914.

**Equipment.**—Statistics of equipment installed in the wire-drawing plants, 1919 and 1914, are presented in Table 94.

TABLE 93.—NUMBER OF ESTABLISHMENTS REPORTING SPECIFIED PRODUCTS, BY STATES: 1919 AND 1914.

STATE.	Total number of establish- ments.	Wire mills.	Depart- ments of rolling mills and other concerns.	STEEL AND IRON.												COPPER.								OTHER METALS AND ALLOYS.										
				Wire.			Coated wire.			Wire nails and spikes.			Wire brads, tacks, and staples.		Barbed wire.		Wire rope and strand.		Woven-wire fence and poultry netting.		Other woven and fabricated wire products.		Wire.			Insulated wire.			Woven-wire products.					
				1919	1914	1919	1914	1919	1914	1919	1914	1919	1914	1919	1914	1919	1914	1919	1914	1919	1914	1919	1914	1919	1914	Brass.	Other metal.							
United States.....	108	99	66	54	42	45	74	69	43	40	35	37	24	24	27	27	16	12	27	26	33	41	30	28	14	9	3	3	1	4	2			
Wire mills.....	66	54	66	54	42	45	49	45	24	22	17	18	8	8	11	10	9	8	12	11	18	23	30	36	17	7	6	2	3	22	28	10	24	9
Wire departments of rolling mills and other concerns.....	42	45	42	45	25	24	19	18	18	19	16	16	16	16	17	7	4	15	15	15	18	15	11	7	3	1	1	2	14	18	15	8		
Alabama.....	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	1	1	1	1	1	1	1	1	1	1	1
Colorado.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Connecticut.....	16	15	7	6	9	9	5	5	3	3	1	1	1	1	1	1	1	1	1	1	1	1	8	6	4	2	1	2	10	10	12	6		
Georgia.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Illinois.....	12	11	10	9	2	2	11	9	8	7	7	8	6	6	7	7	2	1	8	8	7	7	2	2	1	1	1	1	1	1	1	1	1	
Indiana.....	4	4	2	2	2	2	4	4	4	3	4	4	2	2	4	3	1	1	4	3	2	2	2	2	2	2	2	2	2	2	2	2	2	
Kentucky.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Massachusetts.....	11	9	9	8	2	1	9	9	6	4	1	2	2	2	3	4	1	1	4	7	3	3	1	1	1	1	2	2	2	1	1	1		
Michigan.....	2	2	1	1	2	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	
Missouri.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Montana.....	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
New Jersey.....	11	10	7	9	4	5	7	6	1	3	1	1	1	1	1	1	2	2	2	2	4	5	3	5	2	2	1	1	4	5	4	3		
New York.....	12	11	8	6	4	5	4	4	1	1	2	1	1	1	1	1	1	1	1	1	1	1	8	7	3	1	2	1	4	5	4	2		
Ohio.....	9	10	5	5	4	5	9	10	7	6	5	6	3	3	4	4	2	1	2	2	5	5	1	1	1	1	1	1	1	1	1	1		
Pennsylvania.....	18	17	11	7	7	10	16	15	9	10	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
Rhode Island.....	4	3	2	1	2	2	1	1	1	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Wisconsin.....	3	2	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	

TABLE 94.—EQUIPMENT: 1919 AND 1914.

[Ton, 2,000 pounds.]

KIND.	TOTAL.				WIRE MILLS.		WIRE DEPARTMENTS OF ROLLING MILLS AND OTHER CONCERNs.		
	1919		1914		Per cent of increase, <sup>1</sup>	1919	1914	1919	1914
	Number	Annual capacity, tons.	Number	Annual capacity, tons.		1919	1914	1919	1914
<b>Wire-drawing blocks:</b>									
Number.....	62,689	51,181	22,5	26,920	33,242	35,760	17,389		
Rod.....	10,530	7,503	40,3	3,105	3,005	7,365	4,498		
Redrawing.....	10,202	9,067	12,5	6,651	6,565	3,551	2,502		
Fine wire.....	41,057	34,011	21,2	17,104	23,072	24,833	10,939		
	4,169,407	3,882,000	8,2	1,508,043	1,249,000	2,661,424	2,603,000		
<b>Wire-nail machines:</b>									
Number.....	5,383	5,212	3,3	1,632	1,318	3,731	3,594		
Annual capacity, kegs (100 pounds).....	22,040,170	23,904,000	-7.8	7,451,450	5,905,000	14,597,720	17,039,000		
<b>Barbed-wire machines:</b>									
Number.....	1,569	(2)		478	(2)	1,001	(2)		
Annual capacity, tons.....	855,007	(2)		252,418	(2)	603,540	(2)		
<b>Woven-wire fence machines:</b>									
Number.....	457	583	-21,6	100	101	357	422		
Annual capacity, tons.....	677,195	732,000	-7.5	154,552	190,000	522,043	542,000		
<b>Poultry-netting machines:</b>									
Number.....	161	(2)		84	(2)	80	(2)		
Annual capacity, tons.....	41,803	(2)		28,817	(2)	13,046	(2)		
<b>Stands cold-rolling machines:</b>									
Number.....	687	(2)		350	(2)	307	(2)		
Annual capacity, tons.....	184,215	(2)		50,915	(2)	124,300	(2)		

<sup>1</sup> A minus sign (—) denotes decrease.

\* Figures not available.

Equipment, by states.—Table 95 presents statistics for equipment, according to character of the machines.

TABLE 95.—EQUIPMENT, BY STATES: 1919.

STATE.	Wire-drawing blocks— annual capacity, tons.	WIRE-NAIL MACHINES.		BARBED-WIRE MACHINES.		WOVEN-WIRE FENCE MACHINES.		POULTRY-NETTING MACHINES.		STANDS COLD-ROLL- ING MACHINES.	
		Number.	Annual capacity, kegs (100 pounds).	Number.	Annual capacity, tons.	Num- ber.	Annual capacity, tons.	Num- ber.	Annual capacity, tons.	Number.	Annual capacity, tons.
United States.....	4,160,467	5,383	22,040,170	1,569	855,997	457	677,195	164	41,893	687	184,215
Pennsylvania.....	1,443,529	1,769	9,205,846	740	389,208	222	267,449	8	1,500	15	12,150
Illinois.....	715,733	615	3,115,824	313	157,429	95	191,677	67	27,049	8	900
Ohio.....	624,500	1,618	4,450,000	152	98,800	28	53,000	.....	.....	109	120,300
New Jersey.....	257,413	31	30,000	.....	.....	.....	.....	.....	.....	216	21,315
Massachusetts.....	253,830	68	140,000	.....	.....	.....	.....	.....	.....	275	29,350
Alabama.....	215,000	316	1,840,000	120	68,000	55	98,000	.....	.....	.....	.....
Indiana.....	184,000	333	1,500,000	122	49,500	35	40,700	9	3,000	.....	.....
Colorado.....	180,000	250	1,200,000	69	75,000	15	25,000	5	3,000	.....	.....
New York.....	137,880	207	450,000	24	15,000	.....	.....	53	2,500	4	200
All other states.....	157,582	120	117,500	20	3,000	7	1,369	22	4,844	.....	.....

## GENERAL TABLES.

Comparative summary, by states.—Table 96 shows the comparative statistics for the number of establishments, average number of wage earners, primary horsepower, wages, cost of materials, and

value of products for the census years 1919, 1914, and 1909.

Detailed statistics, by states.—Table 97 is a detailed statement, by states, for the census of 1919.

TABLE 96.—COMPARATIVE SUMMARY FOR WIRE MILLS USING PURCHASED RODS: 1919, 1914, AND 1909.

STATE.	Cen- sus year.	Num- ber of estab- lish- ments.	Wage earners (aver- age num- ber).	Pri- mary horse- power.	Wages.	Cost of mate- rials.	Value of prod- ucts.	STATE.	Cen- sus year.	Num- ber of estab- lish- ments.	Wage earners (aver- age num- ber).	Pri- mary horse- power.	Wages.	Cost of mate- rials.	Value of prod- ucts.	
					Expressed in thousands.											
United States.....	1910	66	10,741	119,451	\$29,200	\$102,814	\$162,151	Massachusetts.....	1919	9	5,203	24,799	\$7,353	\$11,874	\$24,552	
	1914	54	17,600	83,940	11,021	56,424	81,841		1914	8	2,589	18,142	2,005	4,050	8,889	
	1909	50	18,084	71,959	10,316	60,543	84,487		1909	10	3,718	10,498	2,218	5,538	9,580	

## MANUFACTURES.

TABLE 97.—DETAILED STATEMENT OF WIRE MILLS USING PURCHASED RODS: 1919.

STATE.	Num- ber of estab- lish- ments.	PERSONS ENGAGED IN THE INDUSTRY.								WAGE EARNERS DEC. 15, OR NEAREST REPRESENTATIVE DAY.						EXPENSES.			
		Total.	Propri- tors and firm mem- bers.	Sal- ried offi- cers, super- in- tend- ents, and man- agers.	Clerks, etc.		Wage earners.				Number, 15th day of—	16 and over.		Under 16.		Capital.	Salaries and wages.		
					Male.	Fe- male.	Aver- age num- ber.	Total.		Male.	Fe- male.	Male.	Fe- male.		Officials.	Clerks, etc.			
								Maximum month.	Minimum month.										
United States.	66	22,236	13	599	1,295	588	19,741	Se 21,282	Oc 17,335	21,800	20,486	1,037	54	23	\$102,016,777	\$2,464,056	\$2,990,350		
Connecticut.....	7	1,555	3	47	93	34	1,378	Fe 1,593	Ap 1,056	1,397	1,246	147	4	....	8,136,575	227,997	202,785		
Illinois.....	10	3,282	133	275	99	2,775	Au 3,300	Oe 1,468	3,109	3,005	104	....	15,477,020	505,313	631,450				
Massachusetts.....	9	5,715	4	89	239	180	5,203	De 5,905	Je 4,910	5,905	5,525	325	37	18	22,027,351	409,217	737,190		
New Jersey.....	7	2,180	....	39	167	51	1,923	Oe 2,066	My 1,717	2,057	1,989	65	3	....	7,972,875	247,105	299,655		
Pennsylvania.....	11	2,471	1	76	138	55	2,203	Au 2,469	Oc 2,005	2,302	2,283	15	4	....	15,376,302	282,044	287,441		
All other states <sup>1</sup> ....	22	7,033	5	215	385	189	6,259	.....	.....	6,830	6,438	381	6	5	33,026,654	792,380	831,929		
EXPENSES—continued.																			
STATE.	Salaries and wages— Con.	For con- tract work.	Rent and taxes.		For materials.		Value of products.	Value added by manufac- ture.	POWER.						Primary horsepower.				
	Wage earners.		Rent of factory.	Taxes, Federal, state, county, and local.	Princi- pal mat- erials.	Fuel and rent of power.			Total.	Owned.	Steam en- gines (not tur- bines).	Steam tur- bines.	Inter- nal- com- bus- tion en- gines.	Wa- ter pow- er.*	Rent- ed.	Electric horse- power gen- erated in estab- lish- ments report- ing.			
United States.	\$20,280,667	\$774,423	\$64,543	\$3,531,988	\$98,578,068	\$4,235,523	\$162,151,236	\$59,337,645	110,451	36,021	25,645	1,966	639	55,130	31,616				
Connecticut.....	2,063,474	3,129	3,243	206,518	4,346,532	256,141	9,083,050	4,480,377	6,354	2,876	1,675	50	150	1,803	4,944				
Illinois.....	4,605,270	....	3,800	838,442	17,763,910	682,905	20,855,393	11,408,488	10,554	13,060	1,920	....	100	4,474	4,484				
Massachusetts.....	7,353,067	4,386	46,222	409,923	10,774,689	1,098,930	24,562,410	12,678,791	24,799	7,577	2,210	....	200	14,812	6,327				
New Jersey.....	2,881,843	....	1,073	311,948	14,149,800	549,574	19,878,316	5,178,142	13,332	1,955	2,300	1,785	7,291	2,735					
Pennsylvania.....	3,850,399	....	573,802	13,865,972	350,433	19,595,888	5,379,483	25,761	2,873	13,877	130	....	8,881	9,176					
All other states <sup>1</sup> ....	8,505,614	768,908	10,405	1,116,295	37,677,305	1,297,450	59,180,170	20,211,364	29,651	7,680	3,683	....	189	13,119	3,950				

<sup>1</sup> All other states embrace: Indiana, 2 establishments; Michigan, 1; Missouri, 1; New York, 8; Ohio, 5; Rhode Island, 2; and Wisconsin, 3.

\* Includes water wheels and turbines (irrespective of ownership of water supply).

\* Chiefly electric motors operated by rented (or purchased) current; other power included (chiefly shaft-belt or transmitted power from neighboring power plants).